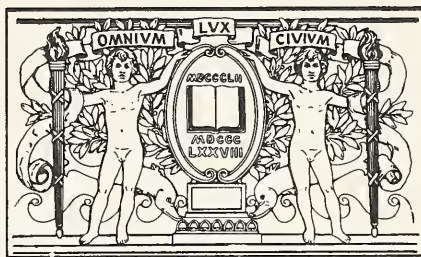


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CITY OF BOSTON.



REPORT OF THE HEARING

BEFORE A COMMITTEE OF THE

House of Representatives of Massachusetts

ON THE

OCCUPATION AND IMPROVEMENT

OF THE

COMMONWEALTH FLATS ON CHARLES RIVER.

NOVEMBER AND DECEMBER, 1869.

Doc for

401.185

H. Parker - Maine

Aug. 1, 1857

Gov Doc

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CITY OF BOSTON.

THE Committee of the House of Representatives, upon the subject of the Flats of the Commonwealth, met at the State House on Wednesday, October 27, 1869.

Mr. BIRD, chairman, read the following notice of the hearing :

COMMONWEALTH OF MASSACHUSETTS.

The committee appointed under the subjoined order will hold their first Public Hearing at the State House on Wednesday, October 27, at ten o'clock, A.M., at which all persons interested are invited to be present.

Ordered, That a special committee, consisting of nine members of the House of Representatives, be appointed with authority to sit during the recess of the legislature, to prepare a comprehensive plan for the occupation and improvement of the flats and water areas of Mystic River, and of Miller's and Charles Rivers, above Charles River Bridge, and of South Bay, Fort Point Channel and Dorchester Bay. Said committee may employ an engineer, and shall inquire what portion of said flats or areas may be occupied; whether with pile structures or solid fillings; what would be the effect of such structures or fillings upon the harbor of Boston; what compensation shall be required for the injury, if any, caused by such occupation of said harbor; and what would be the best method of making com-

pensation for such injury; what would be the financial value of said flats and areas if the plan which the committee may recommend should be carried out; and what would be the best method of selling or disposing of the interest of the commonwealth in said flats and areas. Said committee shall have access to and the use of all maps, charts and plans belonging to the commonwealth, in the hands of the Harbor Commissioners, and His Excellency the Governor is hereby requested, if necessary, to procure access to the same. They shall have their office in the State House, where the maps, charts and plans, records of all their doings, and all documents relating to their business shall be kept. The committee shall report to the next House of Representatives, and it shall be their duty to suggest any new enactments of law which they think needful for the purpose of carrying out any plan presented by them, and of securing the public objects aimed at in the improvement of said flats and areas. They shall keep an account of all their actual services, and of all expenses attending the performance of their duties, to be paid in the manner provided by law for expenses of committees. The authority of said committee shall continue until the action of the legislature thereupon.

The hearing on Wednesday will be principally confined to considering the proposition to fill up Charles River, on the northerly side of Beacon, Brimmer and Charles streets, from West Boston bridge to at or near the Cross Dam, so-called, establishing, if need be, an arbitrary channel, instead of the present Charles River.

Per order of the Committee.

L. M. CHILD, *Secretary*.*

* The committee consisted of Messrs. Bird of Walpole, Kimball of Boston, Baker of Beverly, Nelson of Worcester, Child of Boston, Crosby of Williamsburg, Plumer of Boston, Fay of Concord, and Allen of New Bedford.

He then inquired if any parties appeared by counsel or otherwise in regard to said matter. Messrs. E. H. DERBY, GEORGE PUTNAM, JR., and MELVILLE E. INGALLS, stated that they appeared for different parties who were abutters upon the river.

Mr. BIRD then stated that the committee would assume for the purpose of the hearing that the flats from West Boston Bridge to the cross dam were to be filled in for a distance of 1,400 feet out from the Beacon street side, and that the abutters might prepare to meet that case.

After some preliminary remarks the committee at the request of counsel for the abutters, adjourned to November 5, 1869.

FRIDAY, November 5.

The committee met at half past ten, the Hon. F. W. BIRD in the chair.

Messrs. DERBY, SHATTUCK, PUTNAM, and INGALLS appeared as counsel for various parties; and Mr. HILL, (Assistant City Solicitor) for the city of Boston.

Mr. HILL. I appear here to-day in behalf of the city of Boston with a committee of the city council. The position which the city government of Boston takes is this; they are inclined strenuously to oppose the proposition now before you which they regard as a very alarming one. They do this on general principles, and from no particular interest which the city has in the Charles River; but without intending to speak, at present, finally and decisively on the question, I believe that my brother Shattuck is ready to proceed this morning with the hearing in behalf of certain abutters on Beacon street, who oppose the proposed action of the State; and, therefore, with the consent of the committee, I will reserve our right to put in evidence and to say anything we have to say, hereafter.

Mr. BIRD. Will you please state what proposition it is that the city of Boston opposes?

Mr. HILL. The city of Boston opposes the proposition to fill up Charles River within the line I see pointed out on the

map,—reducing the channel and filling up that large space of flats now covered with water. The city thinks that it is an exceedingly dangerous and fatal thing to do.

Mr. KIMBALL (of the committee). Do the city oppose *any* action in regard to these flats?

Mr. HILL. The city is not here to oppose anything simply for the sake of opposition, but we are here in consequence of the government being alarmed at the proposition which they understand the committee have in contemplation. They appear therefore, to oppose the proposition so far as they understand it, at present. Further than that I don't see that I can say anything at this time.

Mr. KIMBALL. I did not suppose the city came here for the sake of opposition. I did not mean to be so understood in making the inquiry.

Mr. HILL. We oppose reducing the channel of Charles River to from three to five hundred feet.

Mr. KIMBALL. You do not appear to oppose any proposed improvement of this territory, or the occupation of part of the flats, do you?

Mr. HILL. We do not oppose anything we have not heard of; we simply oppose what we understand to be the proposition now before the committee.

Mr. KIMBALL. You do not oppose anything you have not heard of?

Mr. HILL. We reserve our right to oppose or not.

Mr. BIRD. We understand the city of Boston to oppose the plan which the parties opposed to any improvement here have given the public to understand is the plan of the committee, and which is an entire misrepresentation. It is made the duty of this committee during the recess to prepare a comprehensive plan for the occupation and improvement of the flats and waterways in Mystic River, Miller's Creek, Charles River, South Bay, Fort Point Channel and Dorchester Bay. In pursuing that object, we are required to make certain inquiries.

Mr. HILL. The city of Boston, as they are now advised, think that any proposition to reduce to a substantial extent the water-area of Charles River is an exceedingly dangerous one.

Mr. INGALLS. I wish to say in regard to the statement made by the chairman in respect of our opposing this matter, that he represents it in the wrong light.

Mr. BIRD. The statements of the chairman are not matters of discussion. If gentlemen have anything to say in reference to the subject-matter of this hearing, we are ready to hear it, but we do not intend to discuss the opinions or statements of the committee.

Mr. INGALLS. We understood it to be stated by the committee last week, that they assumed for the purpose of the discussion, that the channel of Charles River was to be filled up for a distance of fourteen hundred feet from Beacon street, leaving a channel three, four, or five hundred feet wide, and we were summoned here to say what we had to say in favor of or against that in behalf of the abutters on Beacon street. We asked the committee for the evidence upon which that statement was made, and the statement was that the committee was satisfied on that point, and assumed that point to act upon, and we are prepared to meet that.

Mr. BIRD. The gentlemen can proceed upon any assumption they please.

Mr. DERBY. I appear in behalf of some additional parties. I have the honor to appear in behalf of a committee composed of seven gentlemen elected at a meeting in Ward Six, to oppose any filling outside of the commissioners' line in Charles River,—considering that as settled and sacred. The committee consists of Judge Abbott, Mr. Sidney Bartlett, Mr. George M. Barnard, Dr. Hooper, representing the Eye Infirmary especially, Mr. Bradlee, of the Board of Aldermen, Mr. Nathan Matthews, and Mr. George B. Upton. I suppose many of these gentlemen will be personally present, but I wish to enter an appearance for all of them as representing the almost unani-

mous vote of the ward, — I believe there was but one dissenting voice, — the vote was substantially unanimous, against any filling outside of the commissioners' lines.

Mr. SHATTUCK. I appear here in behalf of several land owners, abutters upon Beacon and Brimmer streets, to oppose any occupation of the tidal basin northerly and westerly of those streets.

It is safe to say, Mr. Chairman, that no legislative committee, and no judicial tribunal in this commonwealth was ever called to the investigation of a question of such magnitude as this which is submitted to you. Most legislation affecting the property, or the health or the morals of the people, can be repealed, if it proves to be defective; but if you shall decide that one of the great tidal basins of Boston Harbor is to be filled up, and one of the great reservoirs of pure air to be occupied, and the legislature shall act upon your decision, the act is irrevocable; its influence upon the health and the happiness of the people, upon the harbor of Boston, and its commercial prosperity will continue for ages. You are charged with the high duty of advising the sovereign power upon that question, and I know, therefore, that you will listen patiently to every suggestion that can be made in relation to the matter, and that you will not decide to act, unless you are satisfied beyond a doubt that the public interest demands action, and demands it at once. There is time enough to consider the question. This land, and the circumstances affecting it may change in five, or ten, or twenty years, and you are called upon to decide for to-day whether there is any such imperative demand for the occupation of these flats, as makes it necessary to run the risk which must be incurred, both as to public health, private rights, and the interests of the harbor.

In 1840, chap. 35, the legislature of Massachusetts declared that no structure should ever be erected outside of a line two hundred feet from the northerly side of the milldam. No structure should

ever be erected. It was a solemn public declaration as to its own land, and after that declaration had been made it proceeded to release the land bounding on that line. It has received a valuable consideration from the parties who occupy it; money has been paid into the State treasury on the faith that that line was to remain, and the commonwealth has had the benefit of it. It is a well-settled principle of law, as between private individuals, that if a party conveys land for a valuable consideration, described as bounding upon a way, that that amounts to a covenant that there is a way and that the way shall continue; and in this case the commonwealth, after its solemn public declaration as to its own property, that that line was to be perpetually established, if for a valuable consideration it sells that property, and parties relying upon the faith of it spend their money and build their houses, cannot in good faith change the occupation of that territory. If the State were subject to the decrees of courts of equity, it could undoubtedly be enjoined against the occupation of those flats; but the State is not subject to these tribunals, and I am not prepared to say that the written constitution will prevent the State from the occupation of these flats (although I do not concede that it will not), but that unwritten constitution which prohibits any act by the legislature which is unjust and oppressive *does* prohibit their occupation. The legislature may do great wrongs: it may repeal, if it pleases, to-morrow, all the laws against murder and theft and arson, and every other crime; it may discontinue the public highways of the commonwealth and not pay a dollar of damage to anybody, if it chooses, in the exercise of its high powers, but it has no right to do it. The unwritten constitution — the only one which they have in England, but which binds Parliament as effectually as our written one binds us — prohibits any act of the legislature which will do injustice to any individual.

The injury to private property by the occupation of these

flats outside of Beacon and Brimmer streets, would probably be measured, in Beacon street and that vicinity, by millions. On Brimmer street, as I am informed, the land on the westerly side, having a view over the water, is worth six dollars a foot; while the land on the easterly side, having no view, but in other respects just as good, is worth from two dollars to three dollars a foot. The difference is not as great upon Beacon street, but there is no doubt that the very great value of those estates depends upon the fact that they have the pure air and view of the water and the country to the north and west of it. If there were no covenant on the part of the commonwealth, growing out of its sale of these lands and the fixing of the commissioners' line, as it is called, still, upon well-established principles of legislation the commonwealth has no right to occupy these flats. What is the principle? Assuming that there is no grant here, nothing in the nature of an implied covenant except the ordinary covenant, that principle is that a public easement — I am assuming that these are merely navigable waters and all the world has an equal right to navigate them, and these individuals have no rights of property in them greater than in a public way, and the act of 1840 had not been passed, — how do we stand? Here is a highway of nations on the back side of these estates, and a public highway of the commonwealth in front of these estates. I think I can state my principle more clearly by an illustration. The control over these public easements in front and in the rear, with certain limitations, is absolute in the commonwealth; in front, in the street, it is absolute; in the rear, however, it is subject to the power of the United States to regulate the harbor for the purposes of commerce, and subject also to the principles of international law, which, to be sure, the State may violate if it pleases, which gives the people of all countries a right to use these waters for navigation. The legislature can, if it pleases, to-morrow, discontinue

Beacon street, it can discontinue Park street, or any other public street. It has absolute control of any easements and the law which prohibits the taking of private property without consideration—the written provision of the constitution—does not, I suppose, apply to it; and therefore, if the legislature should repeal the statutes which provide for compensation, in case a public way should be discontinued, none of the abutters would have any right to compensation, although it might practically destroy a large part of the value of their estates. That is the legal situation in front. Nobody doubts that these people have bought their estates on the faith that that public street in front is to remain there, and it is equally clear, as can be shown, that they have bought their estates on the faith that the opening in the rear was to remain there, and they were justified in doing both.

Now, it is a principle of legislation that the State will never so use its public easements, or so modify them, as to destroy property which has been acquired on the faith that that public easement would remain as it was. I know very well that in the very able pamphlet put forth by the committee of the legislature of 1867, several cases were cited in this commonwealth, and in New York, where the legislature has granted a right to parties to occupy public waters outside of wharf property, and pay no compensation; and according to those decisions, the legislature of Massachusetts can to-morrow authorize the building of wharves outside of Long wharf, Central wharf, and every other wharf in Boston, ruining it for wharf purposes, and pay no compensation whatever, unless they have special grants from the government. There are two decisions in New York and one in Massachusetts. The Old Colony Railroad was allowed to build in front of a wharf, and obstruct its access to navigable waters, and not pay a dollar of compensation; so the Hudson River Railroad was allowed to lay its track 2,000 feet in front of a

farm, obstructing the access to navigable waters, and injuring the value of the property, and not pay the owner a dollar. In the case of Lansing (4 Wendell), the wharf had been granted to one man, and a company was allowed to build a wharf outside of it, and destroy or seriously injure the wharf and not pay any compensation. These three cases have been decided, and the Courts have so held, that under those circumstances the party had no legal right to compensation; but while these cases exist, and for present purposes may be considered law, I declare that there is no instance to be found in England or the United States where a legislature has knowingly acted upon that principle. The cases that have arisen have resulted from the legislature misapprehending the law, or they have arisen under general laws which the legislature did not see the effect of, and I shall show you that it is an established principle in the legislation of Massachusetts, of England, and it ought to be everywhere, that no such rights are to be taken away without compensation.

Take these three cases. In the case in Cushing's reports of the Old Colony Railroad, they took the property under the general law which provided that they should pay compensation to everybody from whom they took property. The legislature undoubtedly supposed that if they destroyed a wharf they would make compensation, but the court held, under those circumstances, the party had no right; but does any one suppose that the legislature of Massachusetts, knowing the fact, would have authorized the Old Colony Railroad to destroy a wharf and not make the owner any compensation? Or does anybody suppose that any honest legislature in New York would have authorized the Hudson River Railroad to destroy or injure the value of the land of an honest farmer, and not pay him a dollar of compensation? The act was constitutional because it contained the provision that there should be compensation; but the Court held that the provision for compensation did not apply to

that case. The man brought his action for compensation under the general law, and, to the surprise of everybody, the court held that the law did not apply to that case; but the legislature never intended to adopt any such principle or act upon it. In the case in the 4th of Wendell, — the case of Lansing, which the committee have cited in their pamphlet, — when that case was decided, the court held that there was no legal claim for damages, but some of the remarks made by Senator Allen, as to what the legislature understood, are very striking. He says this legislation is unjust and oppressive, and if the legislature had known what they were doing they would never have passed it.

So there is no case where a fair and honest legislature has ever acted upon the principle of so using public easements as to destroy private property, but we can everywhere find legislation where the opposite principle is acted upon; and I am happy to say there is no State in which the legislature has been more careful in guarding those rights than the commonwealth of Massachusetts. I find one case in England where a railroad was authorized to build in front of a man's wharf and obstruct his access to navigation, and the English parliament provided for damages. In just this case: building in front of a man's land where it has value to him, no matter whether for purposes of a wharf, for the purpose of view or any other purpose, the English parliament decided that the party is entitled to compensation.

MR. BIRD. Are you not arguing against what nobody proposes to do?

MR. SHATTUCK. If nobody proposes to fill up in the rear of Beacon street —

MR. BIRD. You are arguing for compensation. I think the committee would agree that no Massachusetts legislature would ever take private property without compensation.

MR. SHATTUCK. What I mean is, you have no right to fill up without providing for the injury to light, air and view to those

estates which are bounded on Beacon street. If I am to understand it that the committee do not intend to fill up without paying the parties on Beacon street and Brimmer street for what they are injured in that way, that removes part of my argument. But the general provision for compensation would not be enough, the general provision in the case of railroads; you must put in such a provision as was put in when the mill corporation was established, so that a man could get equitable and just compensation, so that a man that had a store and sold his ashes, and could not get as much for them as before, got compensation from the company. If you propose to apply that, and give every party whose light, air and view is injured by this filling up, proper compensation, that removes part of my argument, but the general provision that private property shall not be taken without compensation will not be sufficient. I want to go beyond that, because I say the legislature of Massachusetts has always gone beyond that where that was not sufficient.

There are other considerations, assuming that these parties are to be compensated. I say that no legislature would ever fill up this territory and injure the property on this land without making compensation, and not such compensation as the constitution, the written constitution requires, but old fashioned, honest compensation, such compensation as justice and equity require. The principle laid down in this pamphlet, as I understand it, is this. It was in reference to filling up Fort Point Channel, and the ground was taken that the legislature had the power to fill up in front of those wharves. The ground was taken in the pamphlet, which is very able, and contains a full discussion of this subject, perhaps the most full that there is, that the legislature has the power to fill in front of those wharves, in front of the riparian owners, without making compensation, unless there is a special grant from the legislature of the right to the wharf. I do not propose here to argue that

proposition; that is, that the legislature may authorize the occupation of the flats in front of a wharf so as to destroy that wharf, and under the provisions of the written constitution there may be no claim to compensation under those decisions. I am (for the purpose of this argument) assuming that that is the law, but I have stated broadly that no legislature, either in England or the United States, ever acted upon that principle; they have universally acted upon the principle, that where private property has been acquired and improved, on the faith that a public easement would remain as it had been, and was at the time the property was acquired, that the legislature will never modify that public easement so as to injure private property. That is a principle of legislation. I have cited the case in the 6th of Meeson & Welsby, and I find a case in Massachusetts to which I will call your attention. The legislation of Massachusetts is very strong on this point, and the first illustration I shall bring is, the case which arose under the charter of the Mill corporation which built the Milldam. They were required to make compensation, and certainly a case arose which seemed to be nearly as remote as could be very well devised, and it illustrates very clearly the principle of legislation which I have referred to. 2 Pickering, p. 33, Boston and Roxbury Mill Corporation *vs.* Gardner.

It requires no explanation to show that this case is inconsistent with the case (in the 12th of Cushing) of the Old Colony Railroad, where they held that they could destroy a wharf and not pay any compensation; and in this case the court did not say that the legislature was compelled to make compensation in this way. It was argued with great ability by William Prescott, one of the ablest counsellors at that time, that there was no private right to a creek which was obstructed; that they were public navigable waters, and the court, for the purposes of the argument, said that might be admitted; they did not propose to go

into the question, what the absolute rights were, but they said there was no injustice in making compensation of this sort, and the legislature which tries, not merely to conform to the written constitution, but to do justice, provided that this compensation should be made, and it was made. That is the principle they have always acted upon, and the accident by which the Old Colony Railroad was able to relieve itself from responsibility for destroying that wharf was merely accident. That is, the legislature passed a general law, and did not contemplate the particular injustice that resulted in this case. So in New York; the legislature, under a general law, or an ill-advised special law, did some wrong which they did not intend to. I have read the opinion of Senator Allen, that the legislature did not know what they were doing, when they passed that law.

Mr. BIRD. Has that law under which this injustice was suffered ever been amended or repealed by our legislature?

Mr. SHATTUCK. No, because it is not probable that another case will arise. It is the general railroad act, providing that where a railroad takes private property, it shall pay compensation. It is not probable that another case would ever come up of that kind. It was a railroad company that owned the other wharf, and they never called attention to it. But I will not waste your valuable time in arguing that the legislature would not authorize a railroad in Massachusetts to destroy a man's wharf without compelling them to make compensation for it, if they knew it. Take other legislation in Massachusetts; our books are full of it, showing the greatest care on the part of the State. You know perfectly well, as a legal principle, that any public easement may be modified by the legislature, and the modification of such public easement is not taking private property; they might to-day close every highway in Boston, and every highway that leads into Boston or into the country if they choose, and if they choose to repeal the legislation in regard to it, they

need not make anybody compensation; but at a very early day in our history a law was passed that wherever a highway was discontinued by any town, city, or by county commissioners, and the power is vested in them, they shall make compensation. About thirty years ago a case arose where the grade of a street was reduced, and a party's property was seriously injured, and he brought action to secure compensation; but as there was no act relating to it, the court held that he could not recover anything, because it was a modification of a public easement which the legislature had control over; but the moment that case was decided, the legislature passed a law that whenever the grade of a street should be changed, compensation should be made to any party who should be injured thereby. They would not allow any such unjust principle to be applied practically, and to-day if a street is changed in any way by raising the grade or reducing the grade, by legislation, the parties are entitled to compensation.

The principle is this: that where parties have spent their money on the faith of the continuance of any public easement, the legislature will not modify it or destroy it without paying compensation. There is another illustration, and a stronger one, in the recent history of the legislation of Massachusetts. The value of property in many villages throughout the State is dependent upon its proximity to railroad stations; it is so for the purposes of business and for the purposes of residences.

When a railroad station is once erected, parties buy their estates and establish their business with reference to the location of that railroad station. But up to a recent period railroad companies have had absolute power to remove stations whenever they pleased; parties had no right to say to a railroad, "You shall not remove this or that station"; but the legislature passed a law within a few years that if a railroad station had been established for five years, so that parties could have acquired property

upon the faith of its remaining there, it should never be changed without the consent of the legislature. Undoubtedly the legislature has acted upon it, and refused changes in many cases; and undoubtedly if parties were to be seriously injured, they would not allow any such change without compensation in some way. That is the law in England; that is the law in Rhode Island. I have not investigated it recently, but I have no doubt it will be the law in most of the States before a long period. It is a just principle, that when public easements have been so used that parties have acquired property on the faith of them, they shall not be modified so as to destroy private property.

You must, therefore, if you propose to fill up these flats in the rear of Beacon street and Brimmer street, and destroy this property,—you may not exceed the power of the legislature,—you must adopt a new principle of legislation; you must commit an act of injustice which no legislature, as far as I know, has ever yet been guilty of. But I go one step further than this.

I don't know that it is contended that this great change in this tidal basin, which I understand is contemplated, is to be made solely for the benefit of the harbor. I take it if that were the sole purpose,—to benefit navigation,—the committee would leave the question to the United States, to whom the jurisdiction belongs. Whenever money is to be expended to improve navigation, we go to Washington; under the Constitution, under the provision giving Congress the right to regulate commerce, they protect the harbor, they establish light-houses, they make all arrangements necessary for carrying on the commerce of the civilized world; and if this were the only purpose, undoubtedly you would go to Washington and seek their aid, or at least consult them, before it could be carried through.

It is unquestionably for the purpose of making money by utilizing the land of which the commonwealth has the fee. It is in the nature of a land speculation, or a land investment, or a land improvement, as you may choose to call it. Now, assuming that

there are no private rights here to be affected, and it stands simply as a question between the commonwealth of Massachusetts and the law of nations, and the general government and its own citizens generally, I assert distinctly that according to the established principles which regulate the legislation of the civilized world Massachusetts has no right to speculate in this property. Let us look at the relations of the parties here. This is a part of the navigable waters of the civilized world. By the constitution, the government of the United States has entire control of it for the purposes of commerce. Nobody denies that Congress could prohibit any filling here, if they choose; they have that control; it is in the nature of an easement on this property, — in the *nature* of an easement. On the other hand, the State undoubtedly has the fee. They have the police powers over it, subject, however, to any legislation by the government of the United States. They can use it for the purposes of health; they can do anything to promote navigation if they choose, subject always to the power of the general government; they can use it or modify it to improve the fisheries, or for any general purpose,—but the commonwealth holds them as trust, solely, for the purposes of navigation, and has its police powers solely for the purpose of using that water or regulating that water for the purposes of navigation and the public health and fisheries. It holds it as a trustee before the whole civilized world, and the trust with which it is charged is to use it as navigable water, to use it for health, to use it for fisheries, but *not* to use it for land speculations. It has always been recognized as a right of one nation to object to the destruction of the navigable waters of another. There was an instance, and rather an unfortunate one, which any of you will recollect, in the early part of the late war, when Lord John Russell protested against the obstruction of Charleston Harbor. It was a hasty act and unwise; there was no permanent intention to injure that harbor, but the principle upon which the appeal to our government was

made has a foundation in international law. We hold it for that trust, and the United States government owns its interest in that trust for the same purpose, and no other; and the commonwealth of Massachusetts has no better right to fill up this land and sell it to make money than the United States government has to sell out its right to control it for the purposes of commerce. That illustrates the principle. Suppose the government of the United States and the government of Massachusetts should sit down and trade together to make money on these flats. The government of the United States could say, "We have the right to control this for the purpose of commerce; you have no right to fill it up without our consent; we have something like an easement in this property: to be sure you have the fee, and we can make a good speculation out of it. We will barter our rights over navigation for so much money, and you may sell your right and get so much money for it, and we will divide it in this way." Would not that shock every honest man, and would it not be a shame and a scandal before the civilized world, and would not every citizen of Massachusetts see the disgrace of the general government trading in its rights to regulate commerce and making money out of the speculation?

But if you propose to fill this up to make money, you assume precisely the position that the United States government would assume. It is a trust for navigation; you have a right to use it and regulate it for purposes of navigation, and for the public health: and if, as incidental to these purposes, land were made; if, using it for the purposes of navigation, or for the benefit of the public health, land happened to be made and sold, the commonwealth might possibly get money from it; but if that enters into the purpose for which you make the improvement, you are as guilty in the eye of the law of nations as a trustee would be who violates his trust and makes money by the use of it, or as a judge would be who makes his judgment because money

is to go into his pocket. There is no way of enforcing the law of nations; there is no tribunal in which it can be enforced. If the United States government chooses to sell out its right to regulate commerce, and make money by it, there is no way in which that can be enforced; no way in which that act can be punished, however ignominious it might be: but the principle is the same; you have the power to do it, but you have no right to do it.

Then again, where are we in this matter, and I will diverge a little from my course and speak incidentally of the effect of this upon the harbor, because I am now speaking of our relations to the United States in reference to the question. We call upon the United States government to take care of our harbor, and we properly do it. Massachusetts contributes to take care of the Western rivers and other harbors, and the United States takes charge of ours. The legislature ought not to have anything to do with the regulation of the harbor in that respect; it has been left by the constitution to the United States. But you propose to do something here which will materially and seriously affect the harbor one way or the other, and if it should happen to injure it, with what face can Massachusetts hereafter ask the government of the United States to spend its money for the improvement of the harbor? They will say, "You have been speculating in land here, making money, and you have it in your State Treasury, and you have damaged your harbor, and now you come and ask the general government to appropriate its money for the improvement of that harbor, to undo the damage you have done in order that you might make a little money out of it."

I know of no case where any amount, any substantial amount of money has ever been made by any government by selling out its public rights, or something in the nature of public rights, except this commonwealth. There may

have been such cases, but the King of England could not do it; he holds the fee to this property under navigable waters in trust for the public, and he cannot sell it without an especial act of parliament, because it affects public right. And although I know nothing of the law upon the continent of Europe, I do not think there is a sovereign in Europe who has ever ventured to make money out of the sale of the property it holds charged with public trusts. I do not say that under all circumstances a commonwealth is not justified in doing it; if it was done merely for the purposes of navigation, or to abate a nuisance, as it was in the case of the Back Bay, and there is incidentally profit realized out of it, there is no reason that I know of why it should not be used. Up to within ten or fifteen years the State acted upon the principle that the riparian proprietors were entitled to all the value which there was between them and low water mark; and if the interests of navigation required that a wharf should be extended over the flats, the commonwealth, as a judicial tribunal, — that is, the legislature, as a judicial tribunal, — passed upon the question whether the public interest required that that land-owner should extend his wharf. It was a disinterested tribunal; the commonwealth never asked the question whether they could make money by extending this wharf or not, or by occupying these flats, but simply as a judicial body it said, "Do the interests of navigation require that that wharf should be extended? If they do require it, let the proprietor extend his wharf." This judgment, as I say, was disinterested, and therefore impartial; but within the last ten or fifteen years the commonwealth has adopted the dangerous doctrine of not inquiring simply whether the interests of navigation or health required that these wharves should be extended to deep water, but they introduce this new element, this dangerous element; that is, they inquire whether the commonwealth can make money by extending this wharf further down to navigable waters. It is a dangerous element. I don't think, as I have already said (and

you will pardon me for repeating it), that any sovereign in Europe would be allowed to determine this question of what part of the great national highways should be occupied with reference to his own pecuniary interests. This judgment ought to be as pure as any judicial judgment in the world, and it was an unfortunate day for Massachusetts when this new element was introduced into these considerations. It has tainted her judgments; they are not impartial; they are not judicial: instead of being the judgments of upright judges, they are the judgments of land speculators upon these questions.

There have been one or two cases where the commonwealth has made some money from the flats, and properly; but in those cases the improvements have always been made solely for the purpose of improving navigation. The very able report, to which I have already alluded, made by the committee of 1867 upon this subject, admits substantially that rule. Speaking in reference to the improvement of South Boston flats, it says:

“It is urged that the commonwealth . . . circumscribed and limited.”

They did not distinctly admit that the sovereign power is thus circumscribed and limited, but they said, “assuming that it is so, we are not going beyond that limit”; so that it must be conceded, and it is understood by all, that the improvement of South Boston flats can be supported, and has been supported, solely on the ground that it was to improve commerce. The case of the mill-dam, where these flats were filled up in 1820, was, to a certain extent, exceptional. The interests of navigation were not very materially affected, but ample compensation to all private owners was made, as I have shown by reference to the case in the 2d of Pickering. The improvement then made was made as an improvement, not in navigation, but for a highway to Boston. It was substantially for a highway to Boston. The mill-dam, the opening of which, I understand, was celebrated here at that time by a grand display and general

jubilee, was built mainly for that purpose; and although I don't think that the legislature of to-day would have granted the powers that were then granted, — and the legislature of that day probably ought not to have granted them,—still they were granted in reference to commercial intercourse with other parts of the State; and the filling up of this territory was mainly inaugurated for the purpose of removing and abating a public nuisance which the whole of the Back Bay had become in consequence of the discharge of drainage into its waters. I understand, also, that this contemplated the creation of tidal mills, and was also for the purpose of manufacturing, but that was incidental only; the main purpose was, to increase the facilities of intercourse between Boston and the rest of the State.

Mr. BIRD. You say the land on Beacon street was sold with the understanding that no obstructions should be erected outside of the line established in the act. Why does not the last clause in the sixth section of the act dispose of that objection?

Mr. SHATTUCK. I am very glad to have my attention called to that point. I have based my argument upon the fact that the State declared its policy that no other building should be carried beyond that line, and that it was so understood, and parties have purchased the land and acted upon the faith of it. There is no law in this commonwealth which cannot be repealed under the act of 1830, or cannot be modified. The legislature has the power to modify any law, and I take it anybody knew that any law fixing a harbor line could be modified and changed. The legislature has the power unquestionably to make any changes that it chooses; but I am merely referring to the declared policy of the commonwealth. These harbor lines were established soon after the survey was made of the harbor in 1835, when it was found or believed that encroachments were being made upon the tidal basins and upon the waters in the harbor generally, and therefore it was supposed that it was necessary to establish lines to prevent further encroachment

forever. I take it that there is no more faith in any property; that no property has been held with more certainty as to its permanence and safety than property which has been acquired by building out wharves, and by building out houses, and occupying land out to this harbor line; not that the legislature had not power to change it, but that the legislature never would change it without making compensation. It is like the highways. As I have already said, nobody supposes that the commonwealth cannot discontinue its highways; nobody supposes that it has not the power to do it; they can discontinue those highways without making any compensation, but all the property in the commonwealth, — real property and much of the personal property, has been invested on the faith of the commonwealth, that those highways will not be discontinued without compensation. It is the unwritten law, — the unwritten constitution, the general understanding, and just so with these harbor lines. The Long Wharf proprietors extended their wharf, and hundreds of wharves have been extended to that line, and large sums have been expended in building wharves. Expensive houses have been built on Beacon street and Brimmer street, and always upon the same faith that they have in public highways, that these public highways would not be modified without compensation. I have not put this at all upon the ground that a constitutional provision is violated, a written provision, or that the Supreme Court of the United States would restrain it because it impairs contracts; for the purposes of this argument, in addressing this tribunal, I concede that the written constitution does not prohibit it, — either the written constitution of Massachusetts or of the United States; but that unwritten constitution which is equally binding, and upon which all the property in the commonwealth bounding upon highways has been invested.

Mr. BIRD. Your argument was, that the faith of the commonwealth was pledged to the owners of property on Beacon street

that there should be no farther encroachment on Charles River. You admit the power, but deny the right. Why is not the right expressly reserved in that act? As matter of fact these lines have all been changed since that act; the harbor lines have been changed all over the commonwealth.

Mr. SHATTUCK. If one instance can be found where those changes have not been made for the benefit of the riparian owner, if one instance can be found where one of these harbor lines, to which I say the faith of the commonwealth was pledged, has been changed, and the property in front taken from the owner by the legislature, when the legislature knew it, that instance has not come to my knowledge; I don't believe there is one. They have changed them, but they have changed them for the benefit of the riparian proprietors.

Mr. BIRD. Your argument was, that the commonwealth had not the right to change that line; I want to know why that right is not reserved in this sixth section.

Mr. SHATTUCK. The power is reserved.

Mr. BIRD. The power existed previously; the right is reserved.

Mr. SHATTUCK. Let me apply the principle. I am very glad to have the suggestion made. I want to see where the weak points are, if there are any. When these harbor lines were fixed, the wharf owners, and other people generally, in many cases where they thought the improvement was called for and would pay, built their wharves out to it. They did so in East Boston, and have been doing it from time to time. These harbor lines the legislature has power to change, just as it has power to repeal any act of incorporation that has been amended or passed since the year 1830; but nobody has ever contended that the legislature, where corporators were in good faith performing the duties which the public has imposed upon them, — nobody ever supposed that the legislature, had a right to come in and repeal those charters. As far as this legislation is concerned, the

Massachusetts legislature stands where the English Parliament does. The English Parliament is unlimited in its powers, it can take away and destroy private property to an unlimited extent; but there is an unwritten constitution, as sacred as our written constitution, which prohibits their doing anything which is wrong or unjust, or which impairs the rights of private property to the extent of a single dollar. We are unfortunate in some respects in having a written constitution, for this reason. The question in the legislature, as I have sometimes heard it discussed, often is, not what the legislature can rightfully do, but what the legislature has the power to do; and it is sometimes assumed, that if the written constitution, which simply limits it in certain respects, does not forbid an act, that the legislature can rightfully do it, and that the legislature has the right to take away and destroy all the property in the commonwealth, and has the right to do it because the written provision that private property shall not be taken for public uses does not forbid it. I have heard it declared that all property not protected by that provision is public property, to be confiscated. They go as far as that. I do not contend, and I wish it distinctly understood, that they have not power to change harbor lines and modify them; they have the power, but when people have acquired property on the faith of that, I say it is the declared policy of the legislature which has been steadily adhered to for years never to injure that private property by modifying those public easements. I think I have answered the question, if you mean that the legislature has a right to repeal it.

MR. BIRD. You said that people had bought land on the northerly side of Beacon street relying on the pledge of the commonwealth that Beacon street should be kept open as a public easement, and that equally they have relied upon the pledge of the commonwealth that these lines should not be changed. I don't see why the last clause does not reserve the right to change the lines if the legislature pleases. The legislature say, "we don't

intend there shall be any misunderstanding about it "; and after fixing this line, they put in a clause reserving the right to change it as they please.

Mr. SHATTUCK. It is not quite civil, perhaps, to answer one question by putting another; but if you will allow me to do it, I should like to ask one. The harbor line was established at the end, we will say for illustration, of Long wharf, at the same time that this was established; and on the faith of that harbor line, the proprietors of Long wharf have spent a large sum of money in carrying their wharf out to that line. Now, as I understand it, the legislature has the same power to occupy the end of Long wharf that it has to occupy the north of Beacon street. I should like to ask if you think that the legislature has the right, — I am not using "right" with the meaning of *power*, — but the right, notwithstanding that clause reserving the power in the act, to fill up and occupy off of the end of Long wharf. If you think it has, the same process of reasoning by which you arrive at that would enable you to say, they have the right to fill in on the north side of Beacon street. Has the legislature the right to fill in the end of Long wharf, Central wharf and all the other wharves after they have fixed the harbor line, after they have built out to it? If you declare, because they have reserved the power in these acts of legislation, they can rightfully do it, then the same process by which you come to that conclusion will enable you to declare that the commonwealth may rightfully occupy in the rear of Beacon street. I admit the power, but I say you have not the right.

Mr. PLUMER (of the committee). Are they not doing that in the case of Atlantic avenue?

Mr. SHATTUCK. They are paying compensation; that is used for a highway. It is merely for the benefit of commerce, and they make compensation.

Mr. BIRD. That is, under the betterment law.

Mr. KIMBALL. They are cutting off a good deal of wharf property.

Mr. SHATTUCK. Certainly they are; but Atlantic avenue is a long ways inside of the harbor line, and it is done with the approbation of everybody; it is made for the improvement of commerce.

Mr. BIRD. I think you are mistaken about its being inside the harbor line.

Mr. SHATTUCK. It is a long distance inside of the wharves; they have been built out; I am very sure that that is so. But Atlantic avenue, so far as any legal principle is concerned, does not differ from building a street in Roxbury; because it is built with the concurrence of everybody, and for public commerce, besides which the parties get the intermediate land. I don't understand that the commonwealth comes in and attempts to get the land. I don't see any resemblance to this case.

Mr. KIMBALL. You say nobody has ever attempted to get possession of the flats inside.

Mr. BIRD. That was brought up in the legislature, and Mr. Dana gave his opinion very clearly, that the commonwealth owned those flats.

Mr. SHATTUCK. The legislature never claimed it.

Mr. BIRD. They referred it to the attorney-general.

Mr. SHATTUCK. At any rate, nothing has ever been done by which the State has asserted any right to those flats. I understand they could not get it through the legislature.

Mr. BIRD. They didn't try to.

Mr. SHATTUCK. That was still better.

Mr. KIMBALL. You are not going to assume that the action of the legislature is going to establish a right or a wrong?

Mr. SHATTUCK. The legislature could establish a great deal of wrong, if they tried.

Mr. KIMBALL. Could they establish a right?

Mr. SHATTUCK. Certainly, by granting it.

Mr. KIMBALL. Would you assume that the action of the legislature established either right or wrong?

Mr. SHATTUCK. Perhaps I don't fully understand the question; but if I do, in dealing with public easements the power of the legislature is such that it can destroy any amount of private property without making any compensation, or it can make a great deal of private property without demanding compensation; the action of the legislature can influence private rights to an enormous extent. The trouble grows out of our written constitution. The theory seems to be, that if a man has property, the courts take care of it, and the legislature cannot establish right, or take away right,—and certain kinds of property the constitution does protect; but certain other rights, which ought to be equally sacred to the legislature, are not protected by the constitution, and those rights are the right to the enjoyment of public easements, which are absolutely under the control of the commonwealth. But the legislature has provided, as I have shown, that these shall not be modified without making compensation, and I say that the legislature ought not to depart from that principle, and modify a public easement, without making compensation in this case.

Mr. KIMBALL. You began to argue about the right of the commonwealth to the flats in the line of Atlantic avenue; and your argument was to the effect that the commonwealth has no right there, because the legislature has not established it; my point is, whether legislative action, or non-action, determines anything in regard to the right of the question any way.

Mr. SHATTUCK. As to the legal title to those flats, of course not. It does not determine to whom the legal title to those flats belongs.

Mr. KIMBALL. Your point was, that the legislature had not established such a right, and consequently it does not exist. You and I know how legislation is managed.

Mr. SHATTUCK. We all of us know something how legislation is managed, but the legislature does not often do (and I don't think in Massachusetts has ever done) very great injustice. I

have always found, however legislatures manage things generally, that whenever it came to taking private property, or injuring private property, by the removal of public easements, the legislature is usually pretty fair, and is determined to do what is just and right.

MR. PLUMER. How was it in the case of the Old Colony Railroad?

MR. SHATTUCK. The legislature never contemplated anything of that kind; they made a general law, that railroads should not take private property without compensation. I don't claim for the legislature absolute wisdom.

MR. DERBY. I think this case of the Old Colony Railroad is strained a little further than it will bear. The wharf of the Worcester road bordered on a channel of about three hundred feet in width. The company had no right to lay vessels at the end of the wharf, but only at the sides. The Old Colony Road carried its bridge across the channel to the centre of the end of the wharf, and the Boston and Worcester Railroad claimed damages for interfering with the berth of vessels at the end of the wharf. The court held, that they had no right to lay a vessel at the end of the wharf, and when they did so they were interfering with the use of the channel for navigation, and that they could not recover any damages for destroying the berth at the end of the pier. They did not decide that they should not be paid damages for their wharf, but the value of the wharf for commercial purposes and navigation was considered by the jury, and constituted the ground for the award.

MR. SHATTUCK. It is a case in the 12th of Cushing: The Old Colony Railroad *vs.* Boston and Worcester Railroad, and they refused to give them any compensation for obstructing the channel at the end of the wharf, on the ground that they had no more right in the navigable waters at the head of the wharf than other people had; that they had no private rights in it, and, therefore, they would not pay damages for it. But the

legislature would never have authorized one road or one individual, if they knew it, to destroy a wharf by blocking up the end of it; and they never will, unless the legislature should be worse than it has ever been before.

I now come (and you will pardon me for occupying so much time) to the consideration whether this will pay or not; whether it ought to be entered upon at the present time. I suppose it is desirable to have this question settled forever, and I hope it will be. The question whether this ought to be entered upon is one depending somewhat upon its financial aspects. The commonwealth has already filled in on the North side of Beacon street 2,580,686 square feet. They began to fill that in, I think, about twelve years ago, and people began to build upon it about eleven years ago, in 1858, and have been building upon it ever since. The circumstances have been peculiarly favorable. It has been a period of great prosperity, when a large number of persons have become rich, and during which a large number of persons of wealth have been driven from their old residences in Boston. Perhaps all the committee know that during that period Summer street, Otis place, Devonshire street, Pemberton square, Tremont street, and other streets that were previously occupied as residences have been occupied by stores, and people have been driven out, and have most of them been driven into the Back Bay territory, so that the increasing demand for houses of the character put up on the Back Bay has been unprecedented; and yet during that period of eleven years, only 949,932 out of the 2,500,000 feet of land have been occupied.

To-day, after the lapse of eleven years since they began to occupy the Back Bay, only about one-third of the commonwealth's land there has been occupied.

Mr. DERBY. Does that include the streets?

Mr. SHATTUCK. That is without the streets. This is available area for selling.

Now, I need not discuss the question of policy, whether it is advisable for the commonwealth to put several million more feet of land into the market, when there is now more land unoccupied, which the commonwealth now owns or has already sold, than will be occupied in the regular course of events, in the next twenty years.

Then, take into consideration all the Water Power Company's land, and the West End Land Improvement Company's land. There is land enough on the south side of Beacon street to meet the demands of the population of Boston, for land of that character for the next forty years.

It has been contended that we needed land in the city of Boston, because the tax payers would go into the country, and in that way get rid of their taxes. But we have annexed Roxbury and Dorchester, and have land enough.

There is more land, therefore, of every kind, land for rich men, and land for poor men, in the rural part of the city and in the densely populated part of the city, ready for the market, than can be occupied for the next forty years, assuming that the city will go on and increase as rapidly as it has increased during the last ten years. Why, then, spend here six or seven millions of dollars, when you have now millions of feet more than will probably be needed for half a century? It is clear that it cannot pay the expense. It is necessary, in the first place, to build this wall. There is thirty or forty feet of mud here in parts of the Charles River, and in some places the channel is twenty-five feet deep. And where it is proposed to put the line, the wall must be built on the line of this channel; and such a wall requires to be built in a more expensive manner, for the reason that there will be in some places twenty-three feet before they come to hard bottom. It will cost, according to the lowest estimate, one hundred and eighty-nine dollars a foot on South Boston Flats. And it would cost two millions of dollars (\$2,000,000) to build these walls on the margin of this channel. It will cost, at

least that. Then there is the filling in of the land. I have no desire to exaggerate; but it will cost, as it was estimated by the committee of 1867, fifty cents a yard on the South Boston Flats. It will cost as much as that here. It will cost more than that, because some of it is over forty feet in depth. It must be filled at an average of fifteen feet above low water mark; and the land would be filled twelve feet, and the streets eighteen, and on the average fourteen or fifteen.

The CHAIRMAN. Your figures make it out seventy feet.

Mr. SHATTUCK. Mr. Chairman: I beg your pardon; I do not say it was forty feet of mud in the channel, but forty feet from low water mark. I was speaking of where the channel strikes out. It is not forty feet of mud. If there were forty feet, there would be seventy-five feet on the flats. I was speaking of the general condition of the territory. It is forty feet before you come to hard bottom, and the new channel would be twenty-five feet deep; and the wall, to be built to the requisite depth, would cost from one hundred and ninety dollars to two hundred dollars a foot; and according to the lowest estimate it would be nearly two millions of dollars. And I understand that this wall on the South Boston Flats, where they have a better bottom than here, will cost at this rate. And there is to be in width four hundred feet of filling. The pressure is such that it requires a wall of great strength in order to resist it. The commonwealth's profit upon some of its lands at the Back Bay comes from the fact that they did not have to build any outer wall. When it filled in the Back Bay, it had the benefit of the mill-dam, which had been built at the expense of mill corporation, or at the expense of the stockholders; and this enabled them to make one or two million dollars. But if you have this wall to build, and you pay the price per foot, which the wall will cost, and add to that the seventy-five cents per foot, which the filling will cost, and that property will cost before it will come to the market, every foot of it, one dollar per foot; and that is putting it as low as any one thinks of putting it.

MR. DERBY. That is before the streets are taken out?

MR. SHATTUCK. No, sir; after the streets are taken out. This is not a matter here of speculation; it is what we know about it. There are lands here now which have been filled in, and we know what it costs, and what the estimates are. So it is not a matter of speculation merely, nor a matter of opinion, but a matter of fact. But there is an abundance of land in the market now. And there is better land than the commonwealth will have, and situated more favorably, and nearer the market than that is, nearer to State street, which can be bought for about a dollar a foot to-day. Then take the interest into account. This wall must be built at once; the filling in must take place as soon as practicable; and you will have an interest account running for forty years before that land can be sold. And there is no man who knows anything about flat property in the commonwealth of Massachusetts who would undertake this to-day, if you would give him the property, nor probably if you would throw in a million dollars besides.

MR. DERBY. You have omitted clearing out the channel.

MR. SHATTUCK. I am not going far into these figures. I leave out these, and give the commonwealth the benefit of twenty-five per cent undoubtedly. I leave that to my brother Derby, when he comes to cipher it out. But I say, taking the roughest and crudest estimate, there is not money enough there to pay for it. And before the commonwealth's land, before this land is all occupied, there will be, in my judgment, more money lost there than made. There are acres of land there, held now by individuals, purchased from the commonwealth which, cannot be sold for the cost and six per cent interest; there are acres of such land. And considering how the interest account is running up, and considering how it will run up during the next ten years, or the next twenty years, I venture to predict, and I am willing to have it put upon record, that before the whole territory of the commonwealth is occupied —

the territory already filled —there will have been more money lost, sunk there, than will have been made.

If the commonwealth had sold it, as the city of Boston has, it never would have got the money back that it cost, and interest. The city of Boston always adopted the theory, that they would not sell land to parties unless they proposed to build. They said that they did not fill up the land for parties to speculate in, but they filled it up for use. And when a party came and was ready to give a bond that they would build in six months, or a year, they were willing to sell him land. And the result was that the city lands sold without profit. But the commonwealth took a different policy, and allowed everybody to come in; and some people who bought and sold out pretty quickly have made money, and other people who bought indiscriminately have lost money. And from this time forth, there will be a great deal more money lost than heretofore by land-owners who cannot sell. This making money was exceptional, and it was owing to the favorable circumstances under which these particular flats were filled up. The commonwealth is the only party which has ever undertaken any large enterprise of this kind that has ever made any money out of it in the long run. Take even the Boston Wharf Company; it has just sold a large amount of land to the Hartford and Erie Railroad Company, and I am told upon the very best authority that the amount which they receive for it hardly covers the cost of that property and interest. It was ciphered out by Mr. Adams two years ago that the original cost to the Boston Wharf Company and the interest was over two hundred and forty, and it has been increasing ever since, and the property is only selling for about three hundred now. I have the pamphlet wherein the figures are stated. Take the Boston Mill Corporation, filling up on the north side of Beacon street. Their stock cost them par forty or fifty years ago, and they have been carrying on land operations and collecting tolls, and their stock is only worth fifty to-day. And probably the actual cost of that

property — I have made no computation, and therefore cannot state with any accuracy — is ten times what it is selling for in the market. And when I consider the interest account, and the location of this land, and the vast amount of land in the market, it is perfectly clear to my mind, and that I know to be the judgment of everybody who has had anything to do with filling in lands, that this enterprise will cost the commonwealth a large amount of money which will never be returned. When I have stated how much has been occupied, the committee will observe that I have not stated how much the commonwealth has sold. This computation is made up by Mr. Fuller, and I give his exact figures. Now, there are probably twenty or twenty-five houses for sale or to let on the Back Bay, showing that there is not at present any very great demand for houses there. Undoubtedly there will be. And I am assuming that we are to have prosperity for the next twenty years as we have had in the last twenty.

I now come to the question of the harbor. And I shall treat this very briefly.

The question is: what will be the effect of filling up a large part of the tidal basin of Charles River upon the harbor of Boston, or of filling up any material part?

We are fortunate, in entering upon this investigation, that we have the benefit of examinations which have been made, not only by scientific men who have approached the subject with a scientific view purely, the United States commission, but we also have a commission for Massachusetts; and we also have the report of the very able and intelligent committee of practical men who examined the subject for the legislature of 1867. I suppose it is fair to say, they approached the subject with a desire to see how much the commonwealth could realize out of the flats of Boston harbor, without prejudicing the interests of the harbor. I take it that these men approached the subject from that point of view. Let me see, therefore, what conclusion these men have come to.

Let me first consider what Boston harbor is, and how it has been maintained at its present depth.

The main channel of Boston harbor has undoubtedly been swept out in the course of ages by the water flowing in and out of the tidal basins of Mystic River and Charles River. These have kept the main channel in front of Long wharf at its present depth. And I need not argue, because it is too clear for argument that anything substantial in the amount of in-flow or out-flow of these tidal basins, without a diminution of the width of the harbor, would reduce the depth of the harbor. When, in 1820, the tidal basin of the Charles River was reduced materially by the construction of the mill-dam, it would undoubtedly have reduced the depth of the harbor if it had not been followed and accompanied by a corresponding reduction in the width of the harbor between Charlestown and Boston, and between East Boston and Boston, by the extension of wharves and the construction of bridges. But there was a corresponding reduction in the width of the harbor, and therefore there was no reduction in the depth of the upper harbor. On the contrary, instead of the width of the channel being reduced between Charlestown and Boston, the effect was at once to deepen that channel. But it did reduce the depth to some extent, of the outer harbor. That has been the effect as we find it to-day.

Now, I suppose nobody contends that the width of the harbor between Boston and East Boston and between Boston and Charlestown ought to be reduced. I suppose it has been reduced as much as is practicable. But it is proposed to reduce the width of the harbor opposite South Boston by filling out and occupying these flats.

The immediate effect, therefore, of the reduction of these tidal basins will be a reduction of the amount of water that will flow into it and out of it, and immediately, or very soon, a reduction of the depth of the harbor, unless it shall be dredged.

I am not stating any principle about which there is any question. It is a principle that has been admitted by every commis-

sion that has ever sat on this question, and I believe is admitted to-day. There was, I believe, at one time a plan requiring that every foot of filling in the harbor should be compensated by a corresponding expansion of the upper tidal basins. That was found to be impracticable, simply because the outlet of the tidal basins was so far reduced that it could not allow safely the in-flow and out-flow of any more water. Therefore all parties, as I understand now, have abandoned the plan of an increase of the upper tidal basins for the purpose of scouring the harbor. At any rate, nobody, so far as I know, denies, who has ever given the harbor a careful examination, that it would be dangerous to reduce these tidal basins, unless the depth of the harbor be preserved by artificial means.

Besides these broad tidal basins act as catch-basins for the alluvial silt which comes down into the Charles River and the Mystic River; so that the water, by spreading out, and moving very slowly deposits this silt. That accounts for the forty feet of mud. So that the water, when it flows through the narrow channels of the harbor, is so pure, that in flowing in and out it operates in two ways; it reduces the amount of water which will flow in and out, and it will take away the catch basin and the deposit of silt which has hitherto prevented any very great deposit of that in the harbor.

I take it that it is admitted that the United States Commissioners have always taken this ground; and I propose, therefore, to read simply some extracts from the report of the committee of 1867.

They argue here, on page fifty-six, in favor of the occupation of the South Boston flats, because they do not occupy a tidal basin, do not occupy any basin, and because it narrowed the channel, and therefore would improve the channel, and tend to deepen it. I read a little on page fifty-six.

"Men who are inclined to think for themselves have suggested that admitting that the filling of a cubic foot of tide water in the basin of Charles or Mystic Rivers entitles the harbor to the

excavation of another foot *in the same basin*, it does not follow that the filling of a cubic foot on South Boston flats equally entitles the harbor to the excavation of another cubic foot in the Charles or Mystic River basins; and this for the very obvious reason that while filling in Charles or Mystic Rivers *may* injure the harbor, filling on South Boston flats *may* not only injure, but benefit the harbor."

That indicates that the committee were in doubt whether this filling would injure the basin or not. You understand this was not a subject which they were discussing, but simply that was their mode of stating it. That is only one clause.

Then they also admit that the channels of the upper harbor have been narrowed, and therefore deepened; while the channels of the lower harbor, which have not been narrowed at all, have been correspondingly shoaled. This is on page eighty. They state, I do not say argue, they simply state that, "The only difficulty has been, that the channels in the upper part of the harbor have been deepened; and in the lower part have been correspondingly shoaled."

The body of water never will keep the channel there. If the depth is widened, then it becomes shallow and if narrow then it becomes deeper, if the same body of water is running through it.

Then here is another statement on page eighty: "We do not profess to have discovered the formula which preserves the necessary proportion between the tidal reservoirs, and the volume of the harbor, but it is entirely clear that the scour of the main channel between Boston and East Boston needs to be increased."

The CHAIRMAN. Read the next sentence.

Mr. SHATTUCK. "Our plan does this:" that is, to reduce the channel. But if you reduce the channel, that increases the speed. You can increase the speed in two ways: in the first place, reduce the channel; in the second place, increase the volume.

This is admitted in various places in this report.

Then again they say something as to the alluvial silt. This is on page eighty-one: "The alluvial contributions to the harbor are very slight. They have been going on ever since the configuration of the coast was established, and have not affected the main channel. Nearly the whole of this alluvial silt is deposited on the marshes, and in the shoal water of the river mouths before reaching the harbor."

That is the reason why we have forty feet of mud in the Charles River, and none in the channel. It is peculiarly fortunate for the harbor of Boston that the rivers that come into it have this wide space on which all the alluvial silt for centuries has been deposited, so that none of it has come into the harbor; and this water moves more rapidly through the upper channels of the harbor, and has scoured them out. But the moment you reduce the channel, you reduce the volume; and it will run more slowly, and will fill up the channel and make it smaller.

Mr. NELSON (of the Committee). The next reason is, that the salt water being more dense than fresh water this material will not be deposited, but remain on the surface and pass off.

Mr. SHATTUCK. The water in the bay is all salt. These rivers generally flow pretty rapidly where there is no tide; and then where they come first to the tide water, they spread out into the bay, and the water is almost still. Then this deposit is made. I had occasion to look into that question some years ago in connection with the Mystic River flats, where the water spread out over these flats, and somebody contended that the deposit was washed from those flats and injured the harbor; but on examination it proved that the water moved very slowly when it spread out over these flats, and that it makes a deposit. And that is the way the marshes have been filled up by the spreading out of the water, so that it operates as a catch basin, and then it comes down rapidly and sweeps through the channels. Nature has provided every means for keeping the chan-

nel of the harbor open for commerce, and the harbor will not fill up unless you reduce it in size.

Mr. NELSON. Is the water salt in these basins?

Mr. SHATTUCK. Yes, sir.

The CHAIRMAN. You do not mean that the water in Charles River is salt?

Mr. SHATTUCK. No, sir; I mean the tide that runs up as far as Watertown. Every river is bringing more or less silt; and there is always a deposit at the mouth of every river.

The CHAIRMAN. The position of the committee is very briefly stated on page twenty-two. But your whole argument is against the theory that the harbor is injured, and that the scour ought to be increased. Your whole argument is against that. The committee take the ground that the deposits, except from the streets, are almost infinitesimal.

Mr. SHATTUCK. That is so; but you state very distinctly that the reason why there is so little carried into the harbor is, that it is deposited in the basins above.

The CHAIRMAN. That is one of the reasons. But we say that the amount is in itself an unappreciable amount.

Mr. SHATTUCK. The amount is enough to fill up the harbor to an injurious extent, if the amount is to be larger than the amount that flows through it.

Mr. NELSON. If you diminish the current.

Mr. SHATTUCK. Let me illustrate. When the Charles River between Charlestown and Boston was filled up in part, by extending the wharves and extending these piers, the first effect of it was, before there was any reduction of the tidal basin, to increase the speed of the current; and of course the amount of water must go through, and the effect of it was to dig out at the bottom. That was the first effect of it, and the natural effect of it. This same water must go through. If they had made the channel wider, and allowed the same amount

of water to go through, the effect would have been that it would have filled up. But if you reduce the width of the channel and not the amount of water, the effect is to increase the rate of its speed, and to gouge out at the bottom.

Now, Boston harbor is simply an outlet of these rivers and these tidal reservoirs. It flows out by East Boston and South Boston down to the Atlantic Ocean. Now, if you reduce the amount of tidal water that comes down through the channel, the effect of it will be to fill up. There is silt enough in any water, however pure, to make a deposit, if it flows slowly enough. On the other hand, nature has adjusted these two things to each other, and as long as the tidal reservoirs are kept as they were, the harbor would have retained the depth that it had previously. When you reduce these tidal basins, you fill up the harbor, unless you narrow. And that was the effect. And wherever they have narrowed it to an amount more than sufficient to correspond with the reduction of the tidal basins, it has increased it in depth, as it is by the bridges in Charles River. I have been able to find nothing in this report contrary to that, and every suggestion thrown out is in favor of that course; and every suggestion that I have seen in any report of any commission is in favor of this same theory. If there is a syllable anywhere in this report, and I know the gentlemen who composed that committee knew how to express their sentiments,—if there is a sentiment in this report that is inconsistent with what I have stated, I will thank any gentleman to point it out.

The CHAIRMAN. I think if Mr. Shattuck will read carefully from the seventy-seventh to the eightieth page, he will find that he is entirely mistaken as to that.

Mr. SHATTUCK. Well, sir, I have read that; and I should like to have anything pointed out where there is anything in the theory, different from what I have stated, advocated anywhere.

The CHAIRMAN. In brief, the reports there taken from the United States Commission, and comparative surveys of Boston

harbor are, that notwithstanding the encroachments made upon the tidal basins by the filling up of the Back Bay, and all other fillings, the actual amount of foreign matter in Boston harbor had not increased, mathematically, one yard in thirty years. That is a pretty strong point against the theory that the tidal basins have been filling up the harbor.

Mr. SHATTUCK. That is not so stated here.

The CHAIRMAN. I beg pardon, perhaps not thirty years; from 1835 to 1861, I think.

Mr. SHATTUCK. The fact is just this: there is no question about these facts. It is a matter of mathematical statement. It is a matter that has been surveyed, and the figures are open to everybody. The fact is this, and it is stated in this report and other reports: the upper harbor has been narrowed as much as the tidal basin has been reduced, and therefore it is just as deep, and a little deeper in some places than it was before. The upper harbor has not been filled up, and the lower harbor, has been filled up. That is the whole story. And that is stated here in different places. I do not know what the inferences may be.

The CHAIRMAN. You are entirely mistaken — entirely mistaken.

Mr. SHATTUCK. Let me just read this statement. I do not quite understand the statement, but the statement which is true, in one respect certainly, is precisely what I have been stating here.

The CHAIRMAN. You can state your opinion, and what you think in regard to that report; but I think I know what the committee state.

Mr. SHATTUCK. "The only difficulty," this is copied from the report, and there can be no doubt about its meaning — "the only difficulty has been that the channels in the upper part of the harbor have been correspondingly shoaled." That is stated in this report.

The CHAIRMAN. That is not in that. That the diminution of the Charles River has not increased the material in Boston harbor; and that the amount has not increased between the surveys made; but that the narrowing of the channel between Charlestown and Boston; but that the narrowing of the outlet of these basins has compelled dredging through, which has carried foreign matter out into the harbor; but that these contributions of foreign matter to the harbor have not increased the aggregate of foreign matter in the harbor between these two surveys. There is no more now than there was when that first survey was made.

Mr. SHATTUCK. I have not said that there was; I have only said this: that by filling up tidal basins you filled up the harbor, unless you narrowed the channel. That is so stated here, and is so stated by all the engineers you can bring on.

I have no desire to go into details in this matter, so far as the harbor is concerned. It is a matter about which, as I say, except in the form of statement, there is no difference, and can be no difference among persons who have studied the effect of the movements of water, as to a view of the great fact, that if you reduce the volume of water flowing through the channel, the channel will be reduced; and if you increase it, the channel will be increased. And the facts which are undisputed, and which are now distinctly admitted in the report are, that where Boston harbor has not been narrowed, its depth has been diminished; and where it has been narrowed, it has remained as it was before, or its depth has been increased. So that if you fill up this basin, you must also reduce the width of the lower harbor, or else it will be shoaled.

And then we come to the question of artificial means. And of course it is dangerous to rely on these, when nature has provided for this want. And the cost would undoubtedly be very great. I shall introduce some testimony bearing upon that question.

But even if the committee are in doubt; that is, if it was stated in 1867 by the committee that the filling in of Charles River *might* injure the harbor; if it is true, as they then stated, that it *may* injure the harbor, then is there no demand for land. Nobody supposes that there is need of the land that will not be wanted for the next forty years. Why undertake this experiment of occupying the flats, and running any risk? Because there must be some risk attending this movement.

Then I come to the matter of health. I do not propose to speak at any length upon this point. It is a matter for the physicians, and persons who have considered this question, to address you.

But no one can fail to see that Boston is peculiarly fortunate in having these large tidal reservoirs in the neighborhood of the city, by which the air is made cool and refreshing; so that in the summer, in the most sultry seasons of the year, a residence in any of these sections of the city, in the neighborhood of this water, is as pleasant as it is on the seashore. And it will be shown on investigation, that these parts of the city under the influences of these air spaces, although they are inhabited by poor people, who live in the same way that they do in other parts of the city, are much freer from any epidemics, much more salubrious than any other parts of the city. And we know that other cities are spending enormous sums of money to introduce into the midst of these cities unoccupied spaces of land. Boston now proposes to spend a large amount of money for a park. New York has spent a large amount. Napoleon has spent millions in furnishing and bringing water, and improving the land about Paris, so as to improve the air spaces. They have in London large parks, larger than anything we can expect to have here in Boston; and all in order to furnish pure air. And here nature has given us not only an unoccupied space, but every day the waters of the ocean wash in and out, to keep it clean and pure, to make the air cool and refreshing.

And yet it is proposed to fill it up. It would be a most serious blow to the health and the happiness of the people of Boston. It is a thing which should not be undertaken unless justified by the most imperative necessity. You might as well fill up the Connecticut River. The State has an interest in the Connecticut River. You might make some money, perhaps, by selling land on its borders. But nobody expects to see it done. Everybody in the Connecticut valley would protest against it. But here we have in Boston harbor waters provided to keep open the harbor, and to keep the air fresh and pure, for the benefit of the people; and every man in Boston who takes an unprejudiced view of the matter will protest against it. I do not believe to-day that there are ten men in the city of Boston who realize that it is possible to fill up these tidal basins of Charles River. Why, everybody who has heard of it, and has an interest in it, has expressed considerable feeling in regard to it, and discountenances it. Nobody will seriously think of it. And if it were seriously thought of for a moment, and believed by intelligent people that this would be filled up, there would be a cry of indignation which would be heard from one end of the commonwealth to the other. There is no reason to justify it. There is no demand for the land. There is no pressing necessity. There is no harbor improvement calling for it. And it must unquestionably take from private individuals vast amounts of property, and seriously affect private rights. It must at least put the harbor in peril, according to the admission of everybody. And it must endanger the health of the people.

I thank you for listening so long to the suggestions which I have made in the case.

But my only policy for going into it at this length is to be found in the magnitude of the question, and in the fact that it is an act which if once undertaken is irrevocable. And I think that if any one of you also live in any of the cities upon the coast, or in the neighborhood of cities of the coast, should find

the strong arm of the commonwealth placed upon you for the purpose of destroying the beauty of the scenery, and injuring the health of the people, and putting in peril the harbor, you would realize how we feel when this movement is made upon us. They might as well take Boston Common. There is the same power and the same right. You might close your commons and your harbors in other towns of the commonwealth, if the commonwealth chose to do it; but it would be grossly wrong and unjust. And just so this act comes home to every citizen of Boston, and of course more especially to those who live with this tidal basin under their eyes, as a gross outrage, as unjust and oppressive.

The committee met, pursuant to adjournment, at 2½ o'clock.

The counsel for the remonstrants proceeded to the introduction of evidence, and called as a witness Mr. Albert Boschke, who was examined by Mr. Putnam.

TESTIMONY OF MR. ALBERT BOSCHKE.

Q. (By Mr. PUTNAM.) What is your occupation, Mr. Boschke?

A. At present I am engaged in harbor improvements; but I am professionally an engineer.

Q. How long have you been a professional engineer?

A. About twenty-five years.

Q. What special department has your attention been chiefly directed to, if any, as an engineer?

A. The hydrographical department.

Q. Any particular branch of hydrography?

A. I had the opportunity to survey some of the principal harbors of the United States.

Q. Name some of them.

A. Baltimore, New York, Boston, and smaller harbors on the southern coast. I had the honor of being employed by a

commission which was appointed by the United States government for the investigation of several of these harbors.

Q. What subjects have come under your investigation in connection with these harbor surveys?

A. In New York, as well as Boston harbor, I have made the surveys to ascertain the effect of encroachments upon the harbors, and to establish harbor lines.

Q. The point I meant was, what class of questions did you examine; that is, was it soundings or currents, or both, or what class of phenomena?

A. It was an examination of those harbors for the purpose of determining the configuration of the bottom of the harbor, and an examination of the direction and force of the current; although the current observations were principally made by Mr. Mitchell, who made them his special study.

Q. State what you have done in the Boston harbor, and how long you were engaged there.

A. I was called here under the direction of the United States commission in 1860, and for about six years I made examinations of the harbor. I made a thorough survey from Watertown and Mystic Pond down to ten and twelve miles outside the Boston Light; and these surveys are laid down upon manuscript maps.

Q. (By the CHAIRMAN.) Was that made in 1860?

A. From 1860 to 1865 or 1866. I have devoted all my energy and good-will to ascertaining the true condition of the harbor.

Q. (By Mr. PUTNAM.) What do these surveys of Boston harbor include?

A. The surveys of the shores, the soundings and the currents.

Q. And also a survey of the shores including an examination of the structure of the borders and bottoms of the channels?

A. Yes, to some extent; and borings through the different strata in different locations.

Q. How extensive a survey have you made of the bottom of the harbor by boring and examination of the materials?

A. In localities where improvements are contemplated, and also in some localities where we wanted to ascertain from the layers of deposits whether we could ascertain the probable source from which the accumulations had come; however, we did not get any satisfactory results; it seems a most difficult question to determine, with any degree of certainty, the locality from which deposited material has come. A gentleman, Mr. Pourtales, naturalist of the United States Coast Survey, has also endeavored to ascertain the source from which the accumulations have come in the lower part of the harbor. He also states that he has failed. It is a homogeneous matter, and difficult to decide precisely from what locality it has come. There is a peculiarly uniform configuration of the deposits in Boston harbor; it is the same almost everywhere, and differs only in the amount of depth in various localities.

Q. You mean that whatever the material may be, you get a uniform appearance?

A. There is a uniform order of deposit, as it appears from the surface downwards. First a strata of alluvial matter, mud, which varies in thickness in various localities; then a stratum of gravel or sand; and then you come invariably to a layer of salt water peat, and below that to the clay bottom which underlies the whole area of Boston harbor. We have made borings to ascertain the thickness of these layers of deposits, and also to ascertain the depth for the foundation of certain sea-walls.

Q. Now, Mr. Boschke, assuming for the purposes of this discussion that it is proposed to narrow the bed of Charles River to five hundred feet in width between the Mill-dam and Cambridge bridge, and to transfer it to the opposite shore, so as to make the harbor commissioners' line on the Cambridge side the northerly and westerly line of the channel, and a line parallel to the commissioners' line south of it the southerly line

of the channel; assuming that such a proposition is pending, I should like you to state whether in your opinion, that, if it were carried out, would be beneficial or otherwise to the harbor, and what its effects would be likely to be.

A. The effects of such a large change in Boston harbor are impossible to predict. It is a project which is of too great a magnitude to predict what change it would cause in Boston harbor. Pray, gentlemen, look at the map, and see how beautifully Boston harbor has been left by nature; it is about the most perfect harbor; it is provided with its own natural scouring power to free its channels from deposits. If the harbor was artificially made by the most scientific engineer, he could not form better arranged basins and road-way for vessels than Boston harbor has.

Q. (By the CHAIRMAN.) You mean the harbor of to-day, or the harbor of 1830?

A. Well, I would prefer its natural condition. I do not see that any changes made so far have been any great improvement to Boston harbor. I wish to impress you that the arrangement of the basins and the roadstead is one which is beautifully arranged, and ought to be preserved.

Q. (By Mr. PUTNAM.) Now, please explain the relation of this Charles River basin to Boston harbor.

A. The Charles River basin is one of the receptacles for the tide water to scour and keep open the roadways; and if you narrow this large basin to a canal of five hundred feet in width, from Watertown down to the Brookline bridge, and down to the Charlestown bridge, you will have an insignificant river, just as the Charles River is now at Cambridge or Watertown. That will be the type of the river through such a change.

Q. Explain the difference between Charles River at Cambridge, which you call insignificant, and what is commonly called Charles River, at Charlestown.

A. Charles River as far as Cambridge or Brookline is a shal

low, narrow river, which certainly cannot be called anything but insignificant. It changes its type immediately when it enters at the Brookline bridge into a large tidal basin, and there becomes an arm of the sea. It is not a river any more. Charles River from the Brookline bridge is an arm of the sea.

Q. Then Charles River ends at Brookline bridge?

A. Certainly.

Q. And from Brookline down, it is an arm of the sea?

A. Yes. An arm of the sea.

Q. (By the CHAIRMAN.) Where is the basin you speak of? What do you call the basin?

A. The tidal basin beginning at the Brookline bridge, and situated between Boston and Cambridgeport and Charlestown. This arm of the sea is a tidal basin. The Charles River begins from Brookline bridge — I don't know but that you are familiar with what I call the Brookline bridge; it is at the location where the Grand Junction Railroad crosses the Charles River.

Q. Begins at Brookline bridge? Where does it end?

A. The basin?

Q. Yes, sir.

A. At Charlestown bridge.

Q. (By Mr. PUTNAM.) Then, in the term basin, you include the broad estuary and the narrow strait down to the gas-works — down to Charlestown?

A. Certainly; you cannot divide that.

Q. (By the CHAIRMAN.) What is *that*? Beginning at the Brookline bridge and ending at the navy yard?

A. Rather beyond the navy yard; between the North end and the navy yard it is all one basin.

Q. (By Mr. PUTNAM.) Now, sir, what occasions the depth of water at Charlestown as compared with the shallow water at Cambridge?

A. It is the concentration of the current of this large basin

into a narrow bed. If you had as narrow an outlet between the North end and Charlestown as it is at Cambridge bridge, without the basin, you would not have such a deep bed.

Q. Does the water of Charles River proper form any large proportion of the water which issues out by the navy yard, from what is commonly called the mouth of Charles River?

A. I don't think so. I have lived on Charles River several years, about twelve miles out of town. I know in summer there is little water in Charles River.

Q. This water at Charlestown, then, is simply the tidal flow in and out of the basin?

A. This is the fact; although the fresh water forms a very important item in maintaining the depth.

Q. Now, sir, how deep is the river there at Charlestown, and how swiftly does it run?

A. It varies from twenty-seven (27) to thirty-five (35) feet.

Q. With how great a force does the water run from this narrowest part of the arm of the sea at Charlestown, where it opens into the main channel of the harbor?

A. At spring tides I have observed a current of one and three-quarters ($1\frac{3}{4}$) to two (2) knots an hour.

Q. And now, sir, what is the effect of this arm of the sea and the water running through it upon the main body of the harbor? And what is the character of that effect? What is its value?

A. It is essential to the preservation of the channels of the harbor.

Q. Please explain how.

A. Because it acts as a scouring agent of the channels.

Q. Well, how is that, sir? Explain the action.

A. The volume of water passing acts as a scouring agent and if you diminish the volume, or its velocity, you lose in the scour that it exerts upon the bottom.

Q. That is to say, if you diminish the volume of water running through, out of this arm of the sea into the harbor proper,

you would diminish the scouring effect of it; and then what would follow?

A. There would be a comparative shoaling and a narrowing follow.

Q. Shoaling of what?

A. Of the channel ways.

Q. Of the channel ways of the harbor?

A. Yes, sir.

Q. Now, how would that shoaling come about? What would produce it? Where would it come from, — the material?

A. If you fill up, as proposed, and thereby have the discharge of the Charles River, with its alluvial matter suspended in it, discharged directly into the roadsteads of the harbor, you would deprive the harbor of this arm of the sea which acts as a catch-basin. As soon as the Charles River leaves Brookline bridge it expands now over an extensive area of flats, where it loses its velocity, except in the thread of the channel, and deposits a part of its burden upon the flats. By filling these flats, you would then carry this material below, as one of the sources to fill up the roadways. Furthermore, there is another source to fill up Boston harbor, or any other harbor on which a large city is bordering, which is the sewerage; and to counteract this class of deposit, we ought to be careful and keep a sufficient current in our roadsteads to purge them from this matter.

Q. That is, if I understand you, the current through the main channel of the harbor is kept up partly by the current from this arm of the sea, which is commonly called Charles River; and the maintenance of that current is necessary to keep the channel clear of deposit, which otherwise would come in from the rivers and sewers and stay there?

A. Yes, sir.

Q. Now, what other force is there besides what is commonly called Charles River, — this estuary or tidal basin, — what other force is there that produces the main channel; that is, principally

that part of the harbor between the wharves at Boston and East Boston?

A. The other estuaries of Mystic River and Chelsea Creek, which bear the same relation to Boston harbor as Charles River does, and act from the same causes and produce the same effects as Charles River does. And I believe our investigations have always led us to point out the importance of the preservation of these estuaries. At first, the United States Commission engaged in a patient investigation of Boston harbor, suggested an increase of area of these reservoirs; and they recommended upon that ground the principle of a compensation in kind, which means that all encroachments in Boston harbor between high and low water should be again restored in these estuaries. And this policy was in fact adopted. But when it came to a practical solution of this problem, to compensate for the reclamation of the South Boston flats, proper calculations and further investigation showed that it would be impracticable to place into these estuaries the amount displaced upon the South Boston flats, on account of the existing contractions at the mouths of Charles and Mystic Rivers and Chelsea Creek. Upon the theory that the volumes of water of the basins correspond with the sections of the outlets of Charles River and Mystic River, it would be necessary to widen the outlets in proportion to the amount of water you additionally introduce into these basins, otherwise you would create a scour which would deepen these outlets to an extent which would be dangerous to the harbor. As from time to time the legislatures had for different reasons authorized the contraction the mouths of these estuaries, it was not possible to go back and widen them again; and consequently the plan had to be given up of increasing these estuaries or tidal basins. But I hope nobody has given up the idea of preserving them in their present state. It is true harbor lines have been drawn in these estuaries which reduce their present capacity. I am not able to state at this moment to what extent, but I have the im-

pression it will amount to one-third of their present capacity; and it is to be expected that the filling up within these tidal reservoirs will certainly take place as far as the harbor lines have reduced them; but there ought to be a limit to which they should be reduced, to avoid serious disturbance in the roadstead of Boston harbor. I believe it is not in the power of any human intellect to predict exactly what will be the result of such an enormous change as we base our discussion upon at present; because the reductions of harbor area which are already now in contemplation, and partly begun; for instance the reclamation of the South Boston flats, the grant to the Mystic River Corporation the building out to the harbor lines, etc., are already changes of such magnitude that we really ought to stop first and see what will be the effect upon the harbor. The effect must be great, very great. Whether the changes from filling so large an area of the harbor, which are going to take place, will be only in the immediate vicinity by deepening the channels, or whether it will show itself by shoaling further down in the harbor, I say I am not able, and I hardly think that any engineer will declare that he is able, to predict the consequence. If there is not an urgent necessity at this moment to make this change, I think we certainly ought to hesitate before we do it. To counteract the injurious effect of the reclamation of the South Boston flats upon the harbor by depriving it of a large tidal reservoir, and since we could not carry out the principle of compensation in kind, the necessity showed itself that we had to resort to artificial means of dredging to do what natural powers of scour would have done; and it is probable that the effect of this reclamation, accompanied by this enormous work of dredging, which contemplates the removal of five or six million yards out of the main channel, will not become an injury. But a project like this, reducing the large estuary of the Charles River to a channel of five hundred feet wide, unprovided with a similar improvement, as just mentioned, would really, I think, be out of the question.

The difficulty of dredging to such an extent as has been proposed for the South Boston flats improvement is greater than I had anticipated. It is a larger work than persons can understand who are not directly connected with the execution of the work. It will take a long time to accomplish it,—beyond all our estimates. I have, at the risk of my own means, attempted to improve upon dredging machines; and it is more difficult than I expected. At present, dredging machines are not yet at such a state of perfection that we can remove five or six million cubic yards in a short space of time, but I hope they will yet be further improved.

Q. Mr. Boschke, how does the bed of Charles River, as examined in your recent surveys, compare with the bed as it appears from the surveys of 1847 and 1861; and by Charles River, I mean what we commonly call Charles River, down there by Charlestown?

A. The survey of 1847 and even of 1861 show an almost imperceptible change in the cross-section within the area between the Charles River bridge and the Warren bridge. The first changes appear as deposits at the North end. At the narrowest portion of Charles River, the bottom is now a hard gravelly surface, which has I suppose been worked down by the current to accommodate the capacity of the present estuary. I do not suppose there is any change going on at present in this cross-section.

Q. Something has been said of the deepening of the channel of Charles River at Charlestown between the surveys of 1835 and the surveys of 1861. I would ask you, in the first place, what causes that deepening; and then whether, supposing the structures upon the sides of the river at Charlestown, or lower part of the river, have reached their limit, and if nothing more is done, whether that deepening is likely to continue?

A. Considerable changes in the shore and obstructions by bridges were made in the period from 1835 to 1861, or even

further back, as early as 1820; but we have only surveys from 1835, which are of sufficient accuracy for comparison. The changes from 1835 to 1861 have been quite considerable upon these shores.

Q. (By the CHAIRMAN.) Which shores?

A. On the Boston side, as well as the Cambridge and Charlestown side.

Q. (By Mr. PUTNAM.) I am speaking of the neck from Craigie's bridge to the mouth of Charles River.

A. I understand the question is asked me as to the causes for the deepening of that locality, and whether there may be anticipated any further deepening.

Q. Yes, sir.

A. Well, the causes for deepening during the periods from 1835 to 1861 have been a further contraction of the shores, and the obstruction by bridges across this locality. But I am of opinion that the cross-section has restored and adapted itself to its present *regime*; I do not believe that any considerable deepening now takes place in that locality. However, it is only assumption. Further surveys will establish that fact.

Q. Will you explain why you think that there will be no further deepening there, if the structures at the side are kept at their present limit?

A. The volume which is to discharge through that locality remains the same until you make essential changes in the estuary above. There is, consequently, no reason to expect an essential change in the current and subsequent change in the cross-section. The section has accommodated itself to the quantity of water which is discharged through it; and, as there is no evidence of any scouring or deepening for some time past, I think that the cross-section has assumed its natural proportion. In yielding soil, a cross-section will restore itself in a short time after you change the quantity of water that passes through it. The velocity which we have here would have acted

upon gravel and clay, the two materials to be met with in this locality, in a few years after the change was made in the area of the basin and the outlet.

Q. Let me put you this question, Mr. Boschke. Supposing you have a basin containing a certain quantity of water at every tide, and you narrow the outlet of that basin by building structures upon either side, so that the amount of water which can get through that outlet in a given time would be less, unless the velocity were greater than it was before, — that is, so that the outlet is too small for the quantity of water that is to come through it, — and suppose the material at the bottom of this outlet to be such as you find in the bottom of Charles River, between Boston and Charlestown, in the first place, how would the water which has got to come through that outlet provide itself with room to pass?

A. It would deepen the outlet by scouring.

Q. By scouring at the bottom. Now, how far would the water go in scouring? How much scour would it make?

A. Until it restores the cross-section.

Q. By cross-section you mean —

A. The capacity of the outlet. It would deepen the outlet in proportion to the yielding of the material. If you do not have a yielding material, it would only increase the velocity. If you have a yielding material, the scour would cause a deepening, or affect the bed of the river. If the sides were mud embankments, the current would remove them, and restore the section in width until the former velocity is restored. If there is a permanent shore, as, for instance, walls, which the current cannot remove, it works itself downwards until it comes to a stratum that the velocity of the current cannot remove, and then the section and velocity remains permanent, and no further change will take place until again a disturbance takes place in the relation between the estuary and its outlet.

Q. That is, it will soon do all it can in the way of removing

material, if the material is of a yielding kind, to make up for the want of room; and what it fails to make up in that way is to be made up by increased velocity.

A. The time which it will take will depend entirely upon the relation between the material and the velocity of the current; and until an equilibrium is established between the scouring forces and the resistance by the material, the velocity will be reduced to that minimum that it will have no power to remove a particle from the bottom. If the current has no power to remove the bottom, no further change will take place.

Q. In this particular case, I understand, that in your opinion, the condition of equilibrium has long since been reached.

A. I think so, but further investigation will show.

Q. Then I will ask you in view of these facts whether there is any occasion to diminish the force of Charles River which should lead to the narrowing of the estuary above.

A. Not from anticipating any further scour and removal of material in this section. The only desirableness would be to reduce the velocity for the accommodation of the shipping, to carry vessels through these draws. A strong current is an objection. But I wish you to remember that there is a provision made to reduce this estuary one-third already, by the authority now existing to fill up within the harbor lines; and that certainly will reduce the velocity in this locality. And I do not see that we ought to go beyond that. I do not think there exists any necessity even to facilitate navigation. It would be very desirable, if it could be done, to regulate the occupation of the flats up to the harbor line upon a certain system, and not allow each person to occupy his own property at will. And I hope that the establishment of the harbor commission as it is now organized will guard against any injury from such a source.

Q. Now, I would ask whether the present velocity of the current through Charles River, the present velocity and volume which I take it together constitute the force with which the

water enters the harbor, require to be diminished, the one or the other, in the interests of the harbor, and what would be the effect on the main channel below, to diminish the volume or the the velocity, or both?

A. The currents in Boston harbor have not at any point reached a velocity which becomes seriously objectionable in the manœuvring of vessels. Of course tug-boats have been largely employed; but when there are a large number of vessels moving at the same time, the use of sails cannot be relied upon any how; but to reduce the velocity on this account would not be advisable, because you would couple with it a diminution in depth.

Q. Would it diminish the depth?

A. Certainly. And therefore I do not see any reason for reducing the velocity in Boston harbor. There is no locality where it is desirable to do it, in order to facilitate the moving of vessels, as it is in New York. In New York it would be highly desirable if the velocity could be reduced.

Q. Do I understand that a reduction in Charles River would reduce not only the velocity but the volume from the main channel into the harbor?

A. Yes, sir.

Q. Then that is clear. And I understand you also that the effect of such a reduction of velocity and volume of the flow from Charles River into the main channel of the harbor would be to produce shoaling somewhere?

A. It would have this effect, and reduce the velocity.

Q. Which would have the effect to produce shoaling?

A. Yes, the effect would be shoaling.

Q. And precisely where that shoaling would take place you cannot tell?

A. I am not able. I doubt whether anybody else is. The confluence of the estuaries, the contractions of the channels, and sudden expansions upon extensive flats causes a complicated

system of forces in Boston harbor. There is hardly any harbor in the world more difficult to study. In particular in the lower harbor the system is most complicated in regard to the combination of forces, on account of its numerous islands.

Q. Now, coming back to the upper harbor, the part which lies between Boston and East Boston, which I understand is chiefly maintained by the tidal reservoirs of what is commonly called Charles River, and Mystic River, and Chelsea Creek.

A. And South Bay.

Q. Does that affect the channel up there? I am speaking of the part between East Boston, and, say Lewis and Commercial wharves.

A. No, sir.

Q. Taking that part of the harbor, I understand you that a reduction of the area of the tidal reservoir of Charles River would produce a corresponding reduction in the amount of water, and a reduction also of the velocity of the water flowing through that channel; and if the Mystic River reservoir were also reduced, it would cause a still further reduction — reduction both of velocity and volume of the water going through that channel. I would ask you, then, whether a great radical change like this in one of these estuaries would have any effect upon the *direction* of that current which is now formed by the combined action of the three upon that main channel?

A. Yes, sir.

Q. Is that a change which can be safely predicted beforehand — this change of direction and the effect of it?

A. A change of direction can be predicted, and where this change might take place. The extent I don't think could.

Q. You could predict a change of direction, but not the extent of the effect?

A. Not the extent of the effect.

Q. Whether or not it would have an effect?

A. It would have an effect, but the amount would be too much speculation.

Q. Now, Mr. Boschke, I will ask you what is the value of this reservoir, the upper part of this reservoir, the part which we are now supposing the proposition to fill — what is its value as an intercepting or catch-basin for the materials brought down the river, and what evidence is there that it has been of value in that capacity?

A. As I have mentioned before, the expansion at the Brookline bridge causes the waters of the Charles River to disperse over an extensive area, and for a large portion of the tidal day to be at perfect rest and without any current. [Interruption by conference of the committee.]

A. [Resuming.] The question was asked me whether this reservoir or arm of the sea acts as an intercepting or catch-basin of the material brought down from the alluvial part of the water-shed of Charles River, and what evidence there exists. As I have mentioned before, the expansion over a very large area of the water discharged in Charles River at its mouth at Brookline bridge permits a large volume of water to stand at rest without any current; during which time it deposits its burden. And it cannot be denied that for this purpose, this estuary is of great value to Boston harbor. And the evidence of it is the presence of a very large amount of the material which is brought down from the river. The material is of such a character that it can be safely supposed that it has been brought there by the currents of the river.

Q. (By the CHAIRMAN.) How much have these deposits below Brookline bridge, on that expansion, risen since 1835?

A. I cannot tell you the figures. I think Mr. Mitchell has investigated it, and shown it upon a plan at least for a certain distance.

Q. You made a survey in 1860 and 1861?

A. Yes, sir; the comparison of the quantities I think I have made also once or twice; but the amount of material shifted from one location to the other was so great —

Q. No, not shifting. I think the committee would like to know upon this point, as long as the witness is able to inform us. We have great reliance upon your opinion.

A. The results of the examination and the quantities obtained are given in the reports of the United States commissioners, and the last report of the harbor commission; and I must beg you to refer to them, instead of to my memory.

Q. Can't you save us the trouble?

A. My memory would not be reliable enough.

The CHAIRMAN. The remonstrants' witness has stated that the estuaries have arrested the amount of alluvial silt. Now, we have a right to know. It is a matter of mathematical calculation. I ask the gentleman to furnish it to us.

Mr. PUTNAM. I understand that it is already in print.

WITNESS. I wish, however, to state, Mr. Chairman, that the period from 1835 to 1861 is a very small period of past ages and those to come. It is very small.

Q. (By Mr. KIMBALL.) How do you fix what is to come?

A. Because I have faith in the existence of this world.

Q. What evidence have you had of it from 1861, these eight years? Have you any evidence of it?

A. No, sir; no surveys have been made since 1861.

Q. Then it is mere supposition on your part?

A. We find such evidence everywhere in the large basins of Boston harbor. We find it here in this basin where the laws of gravity show us that a deposit must take place, if there is any silt coming down from the river, it cannot come from anywhere else. And we find no mud deposit where there are strong currents or no opportunities for silt to lodge. You could not deny that a water shed under agricultural cultivation is of necessity feeding the river with alluvial soil, or alluvial matter; because every acre that is ploughed on that water-shed will contribute a certain quantity, — it is impossible to say how much, which is

carried down by that river. We cannot fail of having evidence on every hand that a river coming through such a cultivated territory as the water-shed west of Boston is, will carry and bring down a large quantity of alluvial matter. This material carried by the river current into the basin, and permitted to rest for a large portion of the day, where the water cannot keep the material suspended in a state of rest, or even at a reduced velocity. It must give off a certain portion of its burden. Only a certain amount of material can be kept in suspension by water in motion. Here we find an enormous amount of such matter enclosed in a basin of the same geological formation as the rest of the harbor. Where there is scour, there is no deposit of alluvial matter. Is not that reason enough?

Q. That has been from the settlement of the country that this silt has been coming down? Of course it has been for all that time?

A. Certainly.

Q. Now I understand you to state that it is not large from 1835 to 1861; but you assume that it will be large in the future?

A. Certainly.

Mr. SHATTUCK. I think you misunderstand the witness. He said the amount of deposit during that period from 1835 to 1861 would not be very large as compared to the amount in ages past or in time to come. He did not say that the amount in that period would be greater or less than the amount in any similar period.

Mr. KIMBALL. Undoubtedly it will be greater. I understand that the witness says it will be greater.

WITNESS. No, sir, if I did, I did not express myself properly. I meant that this same process is going on, and that this catch-basin will accommodate the deposits coming down from this river to a uniform extent. If you reduce this tidal reservoir any, even by filling up to the harbor line, you will deprive the har-

bor to a large extent of the advantages of this tidal basin as a catch-basin.

Q. (By Mr. PUTNAM.) Now, Mr. Boschke, I would like to turn your attention to another subject. Have you had any experience in the planning or construction of sea-walls?

A. Some, limited however.

Q. Well, state some of your recent experience.

A. In the capacity as engineer of the present harbor commission, it became my duty to devise plans for sea-walls to enclose South Boston flats.

Q. You have made plans for the proposed wall on the South Boston flats?

A. Yes, sir.

Q. Have your plans been adopted?

A. My plans have been enlarged upon, and more expensive and heavier structures have been adopted.

Q. Well, now, I want to ask you, sir, going on the same basis as we have gone on before, what sort of sea-walls would have to be built here, if any, and what would be the probable expense of constructing them?

A. It depends on the location of these sea-walls.

Q. Assuming that they are put on the harbor commissioners' line, and on a line five hundred feet parallel, on the Boston side, to that line.

A. I am not able to state. I have made no boring in that locality. I have made some borings on the new harbor line which was to enclose by a sea-wall, flats near Charles street and the Mill-dam, to abate a nuisance, caused by the discharge of a sewer upon these flats. There I found a depth of mud between thirty and thirty-three feet. And the only further evidence I have of the depth of mud is up the basin towards Brookline bridge, where the soundings vary from the mud flats to the channel in depth from eighteen to twenty-one feet. The bed of the channel is gravel.

Q. Eighteen feet of mud ?

A. At low water there is a depth of eighteen feet in the channel, and the flats adjoining it are bare at low water. There must have been from eighteen to twenty feet of mud. The next evidence I have is on the Mill-dam side, near the Brookline bridge. A party has built a solid wharf by means of a wooden bulk head. The piles were driven twenty feet below the surface of the mud ; and when that person attempted to fill in after putting oyster shells behind the bulkhead, the bulkhead was pressed out. From this I assume there must be a very large depth of mud near that. I have no evidence of the depth of mud on the Cambridgeport side along the harbor lines.

Q. (By the CHAIRMAN.) Where did you find from thirty to thirty-five feet of mud ?

A. Where formerly Braman's baths were located, on a line from the Old Ladies' Home to Berkeley street.

Q. The surface of the mud there is above low water ?

A. It was, but has been dredged away below low water a few feet.

Q. And you find this thirty to thirty-three feet below there ?

A. No ; below low water.

Q. You found from thirty to thirty-three feet of mud at this point ?

A. No, sir ; I mean to say thirty-three feet at low water. I found hard bottom thirty-three feet below low water. There were three or four feet of water at low water.

Q. Now, you find twenty-eight or twenty-nine feet ?

A. Yes, sir, from twenty-six to thirty.

Q. Below low water ?

A. Yes, sir.

Q. How deep is the channel there ?

A. The channel is twelve feet. There is a middle ground in that location. One channel has a depth of twelve feet ; the other has a depth of eight feet ; and the middle ground, or shoal, has, I believe, five or four feet upon it at low water.

Q. The bottom of the channel there, I take it, is hard?

A. No, sir, it is not hard.

Q. Mud there?

A. Yes, sir.

Q. How much?

A. I do not know how much, but I suppose the whole bed in this locality is mud. The hard bottom, I suppose, you will find at the same depth as further down between the bridges. There was no occasion for examining this bottom throughout; I could only judge from these facts that I have stated.

Q. (By Mr. PUTNAM.) You say, Mr. Boschke, that the original bed of the Charles River, above the bridges, is of the same depth as down at the bridge at Charlestown?

A. For some distance above the bridges I have very little doubt; further up the river, the only evidence I have is, that at or near the Brookline bridge the depth in the channel is eighteen feet at low water, where the original bed is exposed; but there is no positive evidence that I could give of the configuration of the original bed without sounding it.

Q. Assuming as you seem inclined, that the depth there, at the point you have been speaking of, is the same as the depth down at Charlestown bridge, what would that give as the depth of the mud?

A. That would give for certain portions about thirty feet of mud, which would be reduced to eighteen feet as the bottom rises at the mouth of the Charles River, at the Brookline bridge.

Q. By the mouth of the Charles River, you mean the Brookline bridge?

A. That location I consider the proper mouth of the river.

Q. Now, how does the depth of mud affect the problem of the sea-wall?

A. A greater depth of mud requires a heavier wall, not only for the reason of the depth of mud at the location of the wall — because you might overcome this difficulty by dredging out

the mud, and filling up the trench with gravel; and by driving a pile foundation, you may build a not very expensive wall — but you have to provide for a lateral pressure, caused by loading with the filling the whole area of the mud flat. If we assume the depth of mud thirty feet, you have got to provide for a very great lateral pressure against that wall; which will have to be proportionally heavy in weight or mass, which will make quite an expensive wall. Unless the shore on the Cambridge side should be, as one gentleman stated here, a hard gravel bottom; if that is the case, the wall, of course, would not be so expensive.

Q. Well, sir, I asked you how the depth of mud would affect the expense of the wall. Now, are you obliged to carry your wall down through the mud to the clay bottom?

A. Well, that is, of course, the best way of building a sea-wall; but you may with safety build a less expensive wall by dredging a trench and setting your wall on piles, and filling up that trench with gravel again.

Q. If you fill up with gravel and put in your piles, have you not got to put in a good deal of rip-rap and broken stone, etc., in order to make this sufficiently strong?

A. It would all depend on the quantity of mud you enclosed. If you enclose extensive mud flats, it will exert a lateral pressure upon your wall, for which you have to provide by weight accordingly.

Q. What was the depth of the mud on the South Boston flats where you are building a sea-wall?

A. The location of the outer sea-wall which has been adopted?

Q. Yes, sir.

Q. In dredging the trench we found a very stiff mud, almost clay, which would exert not a very large pressure.

Q. How much depth of mud did you find?

A. Twelve feet of stiff mud, when we reach a solid yellow

and white clay which is hard. The mud on the South Boston flats cannot be called mud, as compared with the mud you find in Charles River basin.

Q. So far, then, as the expense of the wall depends upon the depth of the mud, is it your opinion that any cheaper wall would answer in the Charles River flats than is being put up on the South Boston flats?

A. I presume a cheaper wall may answer, because on the South Boston flats we have to provide for the deepening of the area right in front of the wall to the depth of twenty-three feet at low water, and it is not advisable to have the foundation of the wall above the bed of the channel. That is, I suppose, one of the principal reasons for building such a high and expensive wall in that locality. And in this case I cannot imagine that anybody would propose to make a channel five hundred feet wide and twenty feet deep at low water, because I cannot see any use for it. You cannot get large vessels in a five hundred feet canal that would require that depth of water.

Q. Suppose a channel to be built to provide for such navigation as comes up that river of a requisite depth, and the depth of the mud to be what you find it on the South Boston flats, how would the expense of the wall which is to be required here compare with that of the wall upon the South Boston flats?

A. A less expensive will answer. The class of wall built for the Atlantic avenue is what I should advise to be used here, or a wall such as has been put on Albany street, to enclose the flats of the city territory. In both cited cases the mud has been removed down to hard bottom to get a good foundation for this wall.

Q. You will have to build your wall down as low as the bottom of the channel?

A. Yes, sir. You will have to reach solid bottom, either with the foundation of the solid wall, or you must remove all

the mud down to the bottom and fill up again with some solid matter, as gravel, stone, or chips.

Q. If you found the mud here in Charles River to be such a depth as it is in the South Boston flats, you would build a wall as deep. You are governed not by the depth of the channel, but by the depth of the mud?

A. To have a wall that would be safe, you ought to remove for the foundation of that wall all soft material, whether you build the wall down to that hard bottom in stone, or whether you put it upon piles and fill up to low water again with other solid material. That is a question which expediency will determine when you come to test the depth of mud and decide the depth of the channel.

Q. Within what limits would the cost of your wall as required there be?

A. The walls that have been built on Atlantic avenue and in the South Bay have cost about a hundred dollars per running foot; I believe that is the price.

Q. About how many feet, assuming that the channel is continued in the way that is indicated on the committee's plan, how many feet of such wall would have to be built?

A. I am not able to tell without consulting the map.

The CHAIRMAN. About six thousand feet.

Mr. PUTNAM. That is one side or both?

The CHAIRMAN. It is about 6,000 feet from West Boston bridge to the cross-dam.

A. [*After measuring upon map.*] I should say it would require about twenty-four thousand feet (24,000 feet).

Q. You say about 24,000 feet?

A. It is too rough an estimate to give any close opinion.

Q. Then state between what points this wall would have to be made so that it may be corrected by measurement on the map. Assuming this line on the committee's map to be the line

as far as it goes, between what points would this wall have to be made?

A. The question is, whether it is possible to stop at West Boston bridge?

Q. (By the CHAIRMAN.) You do not mean to say that we cannot if we choose build up a cross-dam, and then run it ashore with a bulkhead, without interfering —

WITNESS. Please explain to me the word "cross-dam." Is it the point between the fall and the empty basin?

Mr. PUTNAM. The lines drawn here seem to run from the mouth of the river at the Brookline bridge.

The CHAIRMAN. But our inquiry was confined to the cross-dam — from the cross-dam to West Boston bridge.

Mr. PUTNAM. Then these lines have misled us.

The CHAIRMAN. The harbor lines on the other side?

Mr. PUTNAM. Not only the harbor line, but the line drawn parallel to it on the committee's plan.

Q. (By Mr. PUTNAM.) Taking it from the cross-dam, supposing that they have built their wall, and filled their flats as far as the cross-dam, how much wall then would it require, including any offset to the cross-dam, which I understand it is admitted will be necessary?

A. Forty-five hundred (4,500) feet; on both sides nine thousand (9,000) feet.

Q. Does that include the offset to the cross-dam?

A. No; I understand from the chairman that a bulkhead could be built there.

The CHAIRMAN. I know it can be done.

WITNESS. A great many things can be done, Mr. Chairman; but it appears to me the question is discussed, is it necessary to build an expensive wall to retain the filling, when that filling is placed upon a large deposit of soft mud, where it will exert a pressure to upset any light wall that can be built? But there

are so many modes of building a wall and accomplishing the object, that unless the special case is given, and all the facts ascertained by soundings, it is almost impossible to give in this stage any opinion how much the structure will cost.

Adjourned to Tuesday, November 9, to meet at 10½ o'clock.

MONDAY, November 8, 1869.

The committee met at half past ten, the Hon. F. W. Bird in the chair.

TESTIMONY OF OLIVER WENDELL HOLMES, M. D.

Q. (By Mr. SHATTUCK.) Will you state, doctor, in your own way, what in your judgment would be the effect on the health of Boston of filling in Charles River between Beacon street and West Boston bridge, reserving only a channel of five hundred feet in width? State in your own way, if you please.

A. I am so far unaccustomed to speaking, on subjects of this kind, although I am very much in the habit of lecturing on topics with which I am familiar, that I have committed to writing what I had to say; and if it should be a little more discursive in its character than would be expected before a committee of this kind, it must be remembered that something must be pardoned to one who has been engaged somewhat in literature for a considerable number of years. I begin by saying at the outset that I am deeply interested as a resident of Charles street, and as a very moderate property owner, in the preservation of our great ventilating area. I am one of very many citizens of Boston who would be deeply afflicted and distressed in mind, body and estate, if this plan were carried out. In mind, as it threatens one of the principal comforts and enjoyments of our lives. In

body, as it contemplates cutting us off from the great air reservoir to which, in the hotter months, we look as the safeguard of our health. In estate, because we have invested our property and our children's inheritance on the faith of a line which we believed to come practically under the safeguard of that ancient commination: "Cursed be he that removeth his neighbor's landmark; and all the people shall say, Amen."

But because I am threatened in my comfort, my health and my possessions, the committee will not the less willingly hear what I have to say on the subject before them. The State would not, knowingly, willingly, needlessly, injure me, or any other of its citizens, were one of us alone concerned in its action. I am, however, very far from being alone in danger from this threatened calamity. A very large number of persons, among them clergymen, women of moderate means, new residents and long respected old citizens who had sought a home by the water side for its salubrity, its comfort and its beauty, would be irreparably injured by the proposed operation. It is not extravagant to say that nothing short of a convulsion of nature, an earthquake, an inundation, a great fire, or the invasion of a hostile army would produce greater dismay, or entail more insupportable losses than the realization of this revolutionary project. Leaving out of sight the financial aspect of the question, the law and the equity of it, even, for the moment, and the possible or probable injury to the harbor, I wish to call your attention to those aspects of the case which I, as a resident of the quarter menaced, and as somewhat conversant with medical subjects, can most fitly deal with. I have lived eleven years in Charles street, and am well acquainted with that whole region.

And first: What is the territory interested in the water park, formed by the estuary of Charles River, considered as a ventilating area? The answer is, the whole city, no doubt, to

a considerable extent; but more especially the western and northwestern sections, over which the southern and westerly winds, the hot and sickly winds of summer, blow cooled and purified. I can show by the evidence of medical men, and I have no doubt hundreds of others, that the breeze from the water area is distinctly felt and recognized as far as Tremont street, at the southeast border of the Common, and as far to the north and east as the Massachusetts General Hospital. But no one supposes these to be the limits of its beneficial influence, which must, as I have said, extend to some degree all over the peninsula at the least. It will not do, then, to talk about the tenants of this or that row of fine houses as being alone, or chiefly interested. Many of these are out of town during the hot season, enjoying the sea-breeze at Newport or Nahant, or seeking quiet and refreshment in the inland districts, while the great body of the residents of our section are dependent on the cooling winds of the ventilating area for such comfort and health as July, August and September permit them to enjoy in their modest dwellings. What, then, would be the effect on this ventilation of filling up the water area with mud, and reducing the channel of Charles River to five hundred or three hundred feet? This extensive district, Charles street, and the streets lying east of it, would of course receive a heated and very probably an insalubrious air in the place of the cool, wholesome breeze over the sheet of our inland lake of ever-renewed sea water. The shores of the narrowed, and of course turbid streams, for its catch-basin would have been annihilated, would probably be occupied much in the same way as they are on the other side of the river. At any rate, they would be brought close to that region of Cambridgeport which, for the smoke of its numerous factory chimneys, and the noise of its hammers, is as nearly uninhabitable as any portion of any suburbs, unless,

perhaps, we should make an exception in favor of the immediate neighborhood of its soapworks. I can prove that the hammering of boilers in Cambridgeport has been a source of annoyance to residents of Beacon street in spite of the wide interval which now separates the two shores, and I often see the dense smoke of the factory chimneys spreading over spaces to which the narrowed river would be as a hand's breadth. No costly residence would ever seek the banks of that narrowed current. Land in the new mud-realm must be sold cheap, or not at all. We must expect to see the new territory occupied by noisy and smoky workshops, like those of the other side, and by an inferior class of dwellings. They will stand on a basin of mud so nearly semi-fluid that, as Mr. Boschke, the able engineer whose convincing testimony we heard on Friday, told us, the great sea-wall that holds it will have to be buttressed on the outside to withstand the enormous pressure of the perilous stuff it confines. The breezes that come over this vast quagmire, with its probable sources of smoke and undesirable gaseous products, will be a poor substitute for the sweet and wholesome air with which the reservoir nature has provided for us inundates large districts of our city. If such may be expected to be the atmospheric effects of closing the ventilating area, the question naturally follows, how far this will affect the health of this part of the city. I know something of the people in Charles street and its neighborhood, and I know that the air which comes over this sheet of water is the very breath of life to them in the sickly season. West Boston Bridge, where the breeze is most felt, is a kind of out-of-door open air hospital. You may see the poor mothers carrying their little children out in their arms towards the close of any sultry day, to let them breathe the cool fresh air from over the salt water. It is the same experience which has taught the Philadelphia mothers to take their children when

suffering from *cholera infantum*, the deadly plague of infancy in both cities, across the Delaware to Camden, daily, or go up and down the river in steamboats, the effect of which has long been known to be wonderfully beneficial. For this I may refer to Dunglison's Practice of Medicine. A pure atmosphere is a matter of life and death to young children. I have often cited the case which may be found in Dr. Collins's work, re-published by express authority of the Massachusetts Medical Society, where it was soberly calculated on data to which I can refer you in the volume, that *sixteen thousand* children's lives had been saved in the course of about fifty years in a single great hospital by introducing a simple method of ventilation. There is no doubt in my mind that the suppression of the ventilating area, as proposed, would cost thousands of infants' lives, to say nothing of its effects on adults. The consequence of this suppression would be, if the act were ever effected,—a diminished purity, or what is the same thing, an increased vitiation of the air in the dwellings of a large section of the city. What would be likely to follow may be guessed from these words of Dr. Youmans, in Appleton's American Cyclopædia: "Upon few things is enlightened medical experience more unanimous than that it [vitiating air] either causes or greatly aggravates the most malignant diseases, such as fevers, inflammations, infantine maladies, cholera, scrofula and consumption." The surgeons of the Massachusetts General Hospital will certainly have more reason to fear hospital gangrene and erysipelas after their operations; the physicians to apprehend an unfavorable issue of any grave disease. The surgeons of the Eye and Ear Infirmary will operate with less confidence for cataract or closure of the iris. The tenants of the Asylum for Aged Females will lose the cheap luxuries of air and sky for which their place of residence was chosen; they will die faster, it may be urged by economists; but Massachusetts is not yet under the social *regime* of the Feejee Islands. I appeal confidently to the officers of all these institu-

tions, with whom I have consulted on this matter, to confirm my statement of the probable effects of crowding Charles River into a narrow channel between banks of mud, to be occupied as it seems likely that they will be.

The more we examine a great city, the more we shall see that it has a collective life, like individual organized beings. It must have its food and its excretions, it must have its brain, in its municipal government, its eyes and ears to warn and direct it, its muscles in the shape of its police and other active servants, and above all it must have its breathing organs. A closely built city with no internal air-spaces may be compared to a fish or reptile which breathes by its gills. But a city which possesses large air spaces may be compared to a higher animal which breathes by lungs. Boston is peculiarly favored in having both sets of organs, the common and public garden one lung, this basin the other. This seems to me like a proposal to cut out the right lung of Boston, or the larger part of it, and sell it as the lights and liver of four-footed beasts are sold in the market. It is proposed that the State, for a consideration, should perform this operation on the strongest and fairest of her children, her stately metropolis. I seem to hear the clink of thirty pieces of silver rattled in her ear to see whether she will be tempted to mutilate her offspring. It seems trivial to speak of the enjoyment, the comfort, which our inland lake lends to all who live near it or visit it, and the crown of beauty which it is to our city. What Quinsigamond is to Worcester and much more, what Pontoosuc lake is to Pittsfield and much more, what the Connecticut River is to Springfield, and the Merrimack to Haverhill, that is the noble estuary of Charles River to Boston, considered merely as an ornament and a source of pleasure.

I wish, with the permission of the committee, to call their attention to one view of the case, which I have heard expressed with such strength of feeling and vivacity of utterance in many quarters that I desire to bring it to their notice in moderate

language. There are legal rights, the exercise of which is the meanest and most aggravating of wrongs, — the meanest, because they are carried out under the protection of an irresistible power, without any risk to the actor; the most aggravating, because there is no remedy for them but silent submission.

I have seen a land-owner deliberately place a line of shanties for the express purpose of cutting off his neighbor's view of a beautiful sheet of water, because that neighbor would not submit to be fleeced in the purchase of his acres. I have heard of a man's putting up a cheap building so as to intercept the view from an observatory, and then taking black mail to allow an opening through it, which opening did not injure the building in the least. I know, therefore, that there are mean men, but I do not believe there is a mean community of American men, and I know the good people of Massachusetts do not form such a community. I intend to build me a new house on the border of Charles River, within the commissioners' line, on the faith of which long lines of noble edifices, the pride of Boston, the ornament of the commonwealth have been erected; for I do not believe the State will be guilty of what I have hardly heard mentioned by my fellow-citizens except as an "outrage." I have faith enough in the honor of Massachusetts; but there are timid people who hardly dare to trust anything. For their sake, for the sake of the taxable property of the city and the State, it is very desirable that there should be an end, once for all, of this tampering with the sensibility of the land market, which is a direct injury to the large amount of new made land the commonwealth now holds for sale, as well as to all the neighboring property, and promises nothing but mischief. For Massachusetts to harm a hair of the head of Boston is to wrong herself. The committee will pardon me for alluding to an impression widely prevalent outside, that political managers are waiting outside these doors to raise a popular cry of "more money!" "more money!" to pay State taxes from the

sale of city lands. We believe that the project can be shown to be rash financially, dangerous to the harbor, threatening to the public health, ruinous to the beauty of our capital, unjust to the city, and dishonorable to the commonwealth. We never wish to see our State, or any of her children, in a condition to justify the application of a famous verse to her or them,

“Down a river did glide, with wind and tide,
A pig with vast celerity;
And the Devil he grinned, for he saw all the while
“How it *cut its own throat*; and he thought with a smile
Of the Bay State’s financial prosperity.”

Q. (BY THE CHAIRMAN.) Are you aware what portion of the cove at Providence has been already filled up?

A. I understand that a good deal of it has been; there has been much controversy on the subject.

Q. You do not know what portion of it?

A. I do not; I have only given you the facts from a medical point of view.

Q. You do not know that as a matter of fact the fillings have constituted about the same proportion of what it was originally as the filling up of Charles River has?

A. I know that physicians consider that the whole process is dangerous. The whole filling up of the cove has been, as I understand.

Q. The past fillings?

A. I only inquired on the special point as it stands at present. With regard to that, I have a very long letter on the subject.

Q. Do you understand that your correspondent takes the ground that the past filling has been injurious?

A. I asked with reference to the filling, and I have only consulted so far as relates to the present filling up of the cove.

Q. I have always understood in regard to the filling up that it has been recommended as a sanitary measure, and expected

to be a source of improvement in that respect. Now, in regard to the necessity of preserving the area of Charles River for ventilating purpose, you get the westward breeze, of course, over this water?

A. The most of my comfort is perhaps from the southerly or southwesterly winds, a very prevalent wind in the heats of the summer.

Q. You get no southerly winds across that space?

A. Of course I do; winds from the south-west.

Q. Well, now, do these health-giving breezes acquire any additional health-giving properties after they enter the city?

A. Why, most assuredly they do. What do these women carry their children out on the bridge for, unless it is for this purpose?

Q. I do not think you understand my question; are these southerly winds after they enter the city more health-giving than before?

A. Certainly they are, because they are cooler. I go to Cambridge constantly, and I know what the air is there, and I know the refreshing, cheering, and health-giving qualities of the air that has passed over the water; it is just the difference between iced water and common water in the hot season of the year.

Q. It is the temperature, is it not?

A. I do not know, it may take up oxygen, or bromine, or iodine; I do not know the precise composition of the air, but good air is a balsam, the best of all medicines, and plenty of it.

Q. And you think it is more health-giving after it passes over this water of Charles River?

A. I should think that it has just precisely that advantage.

Q. What proportion of the area, do you understand, is bare at low water?

A. Well, I never measured it. I should like to answer a little more fully, and go somewhat beyond your question. I observe that at some seasons of the year a very large portion of the flats on the other side are laid bare. I give my experience as to the effect of the water on these flats, and I have resided near them for eleven years. My property and my home have been in that neighborhood. I do not say absolutely that in some conditions of the tide there may not be some unpleasant effect, but I say that I do not, as I have stated, feel any annoyance where I dwell.

Q. Then do you mean to say that where the sewers of Boston are emptying, the flats would be just the same where the wind is allowed to blow over them as it would if they were filled up?

A. I do not; but it must be remembered that you have an enormous oxydizing surface. You do not seem to recognize the influence which these vast reservoirs have on the air which comes over them. I can conscientiously say that the air which comes over this space is cool and refreshing and health-giving. I should not want to say what particular effect there might be under certain conditions, at times.

Q. My question was, whether you consider that these flats, on being bare half of the time, and the sewerage of a portion of the city flowing upon them, are health-giving?

A. I need not answer that, for the simple reason that they are not bare half of the time.

Q. I ask you as an expert; I ask you if these flats being bare half of the time, and the sewerage of a part of the city emptying upon them, are not unhealthy?

A. To that I answer, I do not know; I never saw the flats bare half the time.

Q. (By Mr. SHATTUCK.) Are they bare more than one hour at a time?

The CHAIRMAN. I do not know that that answers the question; I am asking the question of an expert.

A. I can say that I never saw them so. I am talking from experience, not from theory.

Q. I think the committee would like to know whether you, as an expert, would consider that the wind blowing over the flats bare at any time, on which the sewerage of the city empties, are as healthy as winds blowing over water or over an open space?

A. It might be, and it might not; it depends, of course, upon how large the flats are, how much sewage empties, how completely the tides carry it off, etc.

Q. I am asking you this general question as an expert.

A. No, sir; to the best of my knowledge, I wish to answer every question as fairly as I can, but I cannot answer that.

Q. (By Mr. KIMBALL.) Are you opposed to any improvement of the channel of the river, any improvement or alteration of the channel of the river?

A. I will divide that question. I am not opposed to any *improvement* in the channel of the river. I should, of course, question what would be an improvement. To any alteration of the channel of the river, I would say that I might be in favor of dredging away some portion of the flats, and therefore I might be in favor of some alteration.

Q. Is there any objection to dredging a channel, say a thousand feet from Beacon street, and from your territory off, and making an arbitrary channel running direct from Charles River where it enters, up to the basin or the draw in the bridge? Would there be any objection, instead of the water making a channel where it now is, but making an artificial channel?

A. You mean filling up back of Beacon street?

Q. No, sir; I ask you whether you object to dredging and making a change in the channel. I confine it principally to the matter of filling.

A. Well, really I have no opinion about that. That is a hydrographic question, to which I should be very presumptuous if I undertook to give an answer.

Q. (By the CHAIRMAN.) Do you think that the filling up

of any portion of the flats on the Cambridge shore would or would not be beneficial as a sanitary measure? Now, we want really to know what the truth is about this. We have no hobby to ride.

A. I suppose that there are irregularities that very possibly might be rounded off, as those on our side have been. I suppose that something of the same kind that has been done in Boston might be done there. 'The commissioners' line might be perhaps a little more even than it is.

Q. Even if that is all filled up to the commissioners' line, it fills a very large area on the other side. Do you or not think that would be to the health of Cambridge?

A. To the health of —

Q. Of Cambridge, well, of the whole territory of Cambridge connected?

A. As to Cambridge, I could not say without knowing more of the hygienic condition of that city. It is a very difficult question, because it depends on other influences. We are in a crowded neighborhood here, whereas that is sparsely inhabited, and a large portion of it is occupied by factories.

Q. Now, a considerable portion of Boston is to-day drained into the Charles River. The amount of sewerage would be very much increased as the population extends southerly. Now really, I would like to know, and I think the committee would like to know, whether it would or would not, as a sanitary measure, be desirable that the sewerage should be emptied into these flats, and whether carried away by dredging out the flats, or carried into running water and carried out to sea?

A. I have not examined the special conditions of sewerage. I have not touched upon that in my evidence, because I am not competent to answer on so difficult a question.

Q. Is not the question of sewerage connected with the question of ventilation? Is not the purity of the water going to be very much affected by the sewerage?

A. I state the fact of what the ventilation over the water area is to my certain knowledge, and what would probably be the result if the proposed change is made. That is the best way I know of making my experience of the locality serviceable.

Q. That is, that you have lived there eleven years and have not died?

A. I have seen it something more than eleven years, and have had an opportunity of ascertaining many facts in regard to it.

Q. Suppose that it might be said that Governor Andrew also lived in that locality, and that he did die?

A. Let me mention one thing, since you have mentioned the name of Governor Andrew, and I am very glad that you have alluded to it. Such was the confidence of Governor Andrew in the permanency of the commissioners' line that he bought a lot next to the one that I myself purchased. It was a darling project of his, as I know full well. I was second to him in seeking a place here; I was anxious to purchase in this locality, but I found that the governor had been ahead of me. He was seeking here a place to live, and a home for his growing family; and it is safe to say that he must have felt confident that these lines would not be disturbed. I venture to say that if Governor Andrew were alive to-day, with a home purchased on the faith of the establishment of the commissioners' line,—I venture to say that this project would dwindle down to very small proportions before this matter was done with.

The CHAIRMAN. And I think we may say also that some of the committee know that he was too good a lawyer, and too familiar with this subject, not to know that commissioners' lines have changed as any other lines, and that, as in this case, the legislature in the act fixing the lines had reserved specially the right to change if it saw fit.

Mr. SHATTUCK. I beg your pardon. If you read that clause, you will find that it does not reserve any such power. I have not had my attention called to it until it was read, but

on examination I think you will find that the act is not as was stated.

The CHAIRMAN. I beg the gentleman's pardon; I did read the act.

Q. (By Mr. KIMBALL.) Since you refer to it, haven't you lately been troubled from a nuisance occasioned by the accumulation of silt and filth in the vicinity of Brimmer street?

A. Never in my house. But since I have lived on Charles street, there was at one time there a good deal of trouble before what was called "The Dump" was filled up. And I want to draw your attention to the fact, that in this enormous process of mud filling, we are threatened to have that same thing all over again. I believe, as I live, you are threatening to enact the same thing over again; and I do say freely, that before Brimmer street was filled up, that in one portion in the neighborhood of the "Old Ladies' Home," there was a very bad smell; and I should look forward with terror, if a resident of the neighborhood, to any such process of filling up eight millions of feet with a quagmire of mud, and expect that of course there would be innumerable sources of disease arising.

Q. There was a proposition then to fill up to remedy this trouble which was afterwards remedied by dredging?

A. Oh, that is another point; there is a corner that wants some little change in the way of a curve. There were two sources of nuisance. That, I believe, was satisfactorily explained by the witness the other day.

Q. Now, sir, it was not to the satisfaction of the committee; it was explained as the party understood it. Because I believe the thing was not remedied according to the suggestions of the gentlemen. It is admitted, even by those who oppose the hearing here,—it is admitted that there should be a certain amount of filling to remedy that difficulty.

A. It is admitted, I presume you mean, by those who oppose the *project* here. I am sure there are no parties, so far as I know, who want to oppose a *hearing*. The project is what we

oppose, and that is a very different thing. I speak in no other person's name, and I claim to represent the interest of no others than my own family.

Q. Then you think there should be some filling done?

A. Oh, well, I do not want to have that generalization put on record when I have done my best to make it precise. I say, that the corner of that table should be rounded off, for the reason that you do not want to tear your clothes upon the corner, and it is just the same in regard to this as it is in regard to the table; I do not mean to say that I want two-thirds of the table cut away.

Q. Well, I understand you to object to any alteration of the area, then, here, for the purposes of this hearing?

A. Well, I have talked half an hour to explain what I object to.

Q. I know, but I want to understand what you do object to. You say it is not a general objection; now, if you object *in toto* to any alteration, then the committee want to know exactly where you stand?

A. This committee was not brought here to consider any general objections.

Q. Oh, yes, it is.

A. I have the printed notice; the proposition is for a channel three or four or five hundred feet wide, and that is what we are considering, and I have prepared myself for that state of the case; but I have not prepared myself for what any engineer or any expert on the subject might suggest. I am not an expert in hydrography.

Q. Haven't you made up your mind upon these points? We want to understand whether anything can be done with safety, and without endangering the city, in regard to matters that you have testified to, and we take you as an expert, called upon to advise us.

A. As I said before, I have considered this subject as it was published in the announcement in the papers, and if there is any other project I should want time to examine that. I know about

this; I have studied this, and brought forward facts bearing on this, and you cannot deny that I have shown the effect of this will be putting the nose of Boston in the least agreeable region of Cambridgeport.

Q. But you are aware that there is nothing in the call about the chimneys in Cambridgeport? We are not considering that.

A. But if you propose to push these flats over to them, you have got to consider them for the next five hundred years.

Q. (By the CHAIRMAN.) The Back Bay lands have been filled in just the same way as this, have they not?

A. That I have not studied. I understand in a general way that it was a different kind of thing, but I have not studied that point.

Q. As a matter of fact, I would state that the Back Bay lands have been filled up in just this same way. In your judgment, then, in relation to this point, you think that it must have been a sanitary mistake?

A. It does not follow that it was just the same. I do not know that the physical conditions were not very different. I do not want to go into a subject on which really I am incompetent to answer; my impression was, that a vast amount of clean gravel went into that basin. And so I say it is a very complex question, on which I am incompetent to answer.

The CHAIRMAN. I think it is well enough to say, Dr. Holmes, that the information you got from the public prints as to what we propose to do was entirely erroneous; nothing of that kind is contained in the order as it was passed or printed, and it is not contained in any advertisement, nor in anything from the committee here. The committee stated distinctly that they adopted an arbitrary line of either three, four, or five hundred feet merely for the purpose of making our measurements of what amount of flats should be left, but we did not adopt the location of the channel, nor the plan that it should be either three, or four, or five hundred feet as the width of the channel. It was stated, at the first hearing, that the location of the channel was

by no means determined upon. The width was not determined upon, but we took that as a convenient line from which to make the measurements of the whole area of that channel, and that channel to be there or somewhere else, and it was not to be three hundred feet wide nor fifteen hundred feet wide; nothing of the kind has been announced.

WITNESS. There seems to be some misapprehension here in regard to what has been stated; I took the proposition as I have seen it here, and as stated in the public prints.

Mr. SHATTUCK. I think we can avoid any trouble.

The CHAIRMAN. We have no trouble at all.

Mr. SHATTUCK. I understand that we offer our evidence here on this point in opposition to any substantial diminution of the water area of this tidal basin?

The CHAIRMAN. We so understand it.

Mr. SHATTUCK. I do not know that Dr. Holmes's testimony is material except on that point, and bearing on that question. I suppose that if the same reduction was made in the water area, it would bear in the same way.

Q. (By Mr. KIMBALL.) I understand that you are not in favor, doctor, of any improvement of the flats?

A. "I understand Mr. Kimball to be in favor of injuring the city of Boston." I might just as well say that. I am not opposed to *improvements*, but I am opposed to certain measures.

Q. I have asked Dr. Holmes the question two or three times; I do not get him to admit that he is in favor of any improvement. The doctor is not understood to be in favor of any improvement.

A. Have you understood me to say that I was not in favor of any *improvement*? I have not said any such thing; and I will not go on the record as having said any such thing.

Q. I understand you that you are opposed to the occupation of any part?

A. I have not said any such thing.

Q. That is what I understood you.

A. Then you understood me entirely wrong.

Q. Then you are not opposed to the occupation of some portion of the flats?

A. I have stated in a distinct way what I am opposed to. I am opposed to an increase of the area of the territory beyond the commissioners' line, on the faith of which Governor Andrew and myself bought house-lots, and I have given reasons.

Q. There is no battling of wits here, and no attempt to injure the city. We are ordered to inquire into this matter, and we desire to inquire; and if it is shown that there should be no filling, and that no change should be made in the channel, the committee will so report. I am very certain, for myself, that there is no attempt to injure anybody. Gentlemen seem to come here with testimony, and make remarks before the committee, as if there were to be some great wrong in what this committee intended to do. We find parties taking one extreme, and the committee are almost forced to the other.

A. All I wish to say is, that I desire to go upon the record rightly as to what I say here, so that I may know I am not being misrepresented in my statement. It would not do for me to go before the public as being against anything in the way of *improvement*. All I ask is purity of the record.

Q. I know, doctor; but we want the advantage of your scientific knowledge as to what we ought to do. If you do not see your way clear, it is all very proper; I do not object.

A. I think the particular proposition is injurious; and to that point my testimony has been mainly directed.

Q. (By Mr. ALLEN.) Would there be in the proposed change anything injurious as to any part of the flats that are talked of in this discussion?

A. As to any occupancy beyond the commissioners' line, I know it would be a great injury to the present owners; and I think it would be a great injury to the city.

Q. (By Mr. CHILD.) What I understand you to say is, that just as much as you reduce this area, just so much you do injury to the sanitary condition of that portion of the city.

A. Theoretically it follows, of course.

Q. (By Mr. ALLEN.) I understand you that any occupation of the flats outside of the commissioners' line would be injurious.

A. I believe it would be injurious in a sanitary point of view, and especially from incidental consequences, which, as I have stated, would follow. And I should like to add a few words to what I have stated. If the new land made is a narrow strip, the principal objection would be the wanton injury of a vast property with a very small amount of gain to anybody. If it is a wide strip, I believe it will be occupied by an inferior class of dwellings, and consequently the land will be cheap, and it will naturally become an ill-conditioned suburb of the city, one something like that on the other side of the river.

Q. (By Mr. KIMBALL.) Suppose there were a wide, deep channel of a thousand feet, running from the mouth of the Charles River up to Brookline bridge and down to Cambridge bridge, and that upon each side was a wide and beautiful esplanade. Do you believe that would be an advantage to the territory of Boston, or not?

A. I suppose, under certain circumstances, it would be a very great disadvantage. You ask the general question, as a sanitary matter, whether a stream one thousand feet wide would be any substitute for the water area of the reservoir.

Q. But suppose when you did this you removed an equal quantity, or half the quantity, of the flats that lay bare at low water with the exhalations of foreign matter. Is not that injurious?

A. I have stated in reference to these flats that they are not, to the best of my knowledge. I believe that they do not practically interfere with the health-giving qualities of that salt water lake. I have proved it in this way: I have lived there

eleven years, in the enjoyment of a partial view of the river, and in close proximity to the water. I bought a new lot, with the intention of getting nearer to it. I sold again for various temporary reasons; and I have again bought, and bought nearer the flats, for the purpose of enjoying that river. That shows you, by practical evidence, what I think of these flats. I believe that they do not interfere with the health-giving properties of that large expanse of water. These flats are daily covered with salt water, and when they are not, they are in a state of "pickle," as you might say. They are covered more or less with vegetable growths, and there are crabs and shiners there that pick up the refuse of the city, in the same way as the whitebait are said to in the Thames, for the city of London. I have no doubt that you have a sanitary commission there that do more than almost any commission has done from time immemorial.

Q. Suppose there was no chance for the sewerage to lodge there, but that it was carried at once into a rapid stream?

A. You ask me a great many questions that I cannot tell you anything about; and I am very free to tell you that I do not know anything about many of these points.

Q. I was going to ask you a thing that pertained to your profession, doctor; I thought it was following that out.

A. What is the question?

Q. Why, in regard to the healthfulness of the flats.

A. I have stated about the flats, but I cannot, from my own knowledge, speak of the relative health of a running stream. These are very healthy, I think.

Q. Then I understand you, doctor, you would not object to exhalations from flats at low water at Cambridge; and you do not object to exhalations that have to be dredged out at the corners?

A. You oblige me to answer at length; I cannot give a short, sharp answer to that. I must explain in reference to this corner. All engineers understand perfectly well the action of a corner

just as the housewife does who has to sweep out corners. We understand all that. Then everybody understands the dock question. It confuses us to mix these questions up. Here is a little nasty dock, into which the dead cats and all sorts of refuse are thrown. Of course it would be very well to fill that up; but it is quite idle to say that we are to judge by that all the surface over which the water extends. The question to which I have confined myself is the sanitary influence of this large water area, which is a great laboratory of the best chemical agents, acting for the purifying of the air of the western half, and we may say of the whole of the city. I am answering this question as well as I can. I can answer best what I have studied during these last eleven years.

Q. But just now, when you answered about this corner, you thought it would be best to round it off as a matter of convenience?

A. I explained that this is an incidental case in this instance.

Q. Then you think it would be well to fill up certain localities as matter of health; up in that corner for instance?

A. Let me state this so that no advantage shall be taken by any ignorant persons. I am not afraid at all, if I am understood as to what I mean; but I claim the right to state it in the most distinct manner. A very small fractional alteration of that corner would no doubt be useful to the locality of the corner. That has been long understood. Any other conclusions drawn from that in reference to the great water-surface are mere sophistry, and trifling with words.

Q. (By Mr. DERBY.) In regard to these flats that lie within this fifteen hundred feet there, whether in looking out across the water, they are offensive to the eye?

A. When I bought my lot in Brimmer street — you must take it on my word and its own probabilities — one of the attractions that I recognized among the minor pleasant conditions connected with that locality was watching the men that worked

upon these flats. It is one of the prettiest exhibitions of the human figure, and one that has delighted my eye almost as much as the brilliant sparkling waters. It is one of the most delightful scenes I ever saw; second only to the view of the bridge.

You provoke me to say things that I have omitted, but which are obvious. Among the incidental beauties and pleasures here are also those annual and much more than annual regattas which everybody knows call out a vast multitude of people. And even for these considerations alone, the State can well afford to retain this spot. It is very much as at Danvers, where they still preserve the old training ground. It is at once historical, and ornamental, and a source of ever-renewing pleasure. Merely for these requisites, it were worth a great deal, and fitting for a magnanimous State to keep such a place. This is not, perhaps, a major motive; but all of these things, when we are dealing with a project of this kind, are to be considered. This is not something to be done from motives of mere huckstering. I take it that the Commonwealth of Massachusetts is not a State that wants to cut off part of her nose to spite her face. There is no such meanness in her as that. She will not sell what once she has set apart to be an ornament, to be a source of health, to sweep clean the ocean gateway of her metropolis. She will not tamper with a project which would leave a lasting stigma on her virtually plighted faith, on the strength of which so large a portion of the wealth and taste of the citizens of Boston has expended itself to beautify this part of the city.

Q. Do these flats give any more than a darker shade of outline across the water? Is there anything offensive in the appearance of them?

A. My best answer is in the fact of my sticking close to them. I will not go out of the sight and smell of these flats. That is the best proof I can give of what they are. Three times I have had a chance to choose my residence, and each time I have got nearer and nearer to the flats.

TESTIMONY OF GEORGE DERBY, M. D.*

Q. (By Mr. INGALLS.) Will you give your opinion upon the proposition of filling up the Charles River, having a channel of three or four, or five hundred feet; will you state what its effect would be in a sanitary point of view upon the locality?

A. In reply to your question, sir, I should say that the filling up of the present limits of the Charles River basin in any material degree, to any considerable extent, must inevitably be detrimental not only to the people of Boston, but to the people on the opposite shore, to the whole territory surrounding this locality. If you will allow me to state on what general considerations this opinion is based, there is a relation existing between the mortality of disease, and the density of population, other influences being equal. In the territory occupied by a hundred persons to the acre you will have more deaths, you will have more disease, than in the territory occupied by fifty; and in a territory occupied by fifty, you will have more than in a territory occupied by ten. This general proposition has been established beyond all question in Europe and in this country. This is due to the purity or impurity of the air enjoyed by the inhabitants of the territory chiefly,—I should say almost exclusively, in my own individual opinion. Setting aside the question of drinking-water, I should think it a question of air, almost entirely, and I should say in almost all circumstances it was a question of the purity of air. This impurity arises from two or three sources, one the respiration of men and animals and the exhalations from their bodies; from the decomposition of organic matter thrown into the air, and from the fermentation of the excrement of animals and of men; and also from the decomposition of animal and vegetable substances, chiefly those used as articles of food. As the air is rendered more pure, life is certainly saved; as air is rendered

* Secretary of the State Board of Health.

less pure, life is certainly sacrificed. The particular forms, the particular diseases, under which death and sickness visit a population under these circumstances of impure air, decomposition from animal or vegetable substances, are, I should think, felt at the extremes of life, and especially in infancy. Young children are the sensitive gauge of the sanitary condition of a territory or district. There the mortality is greatest, and chiefly in these cases through diseases of the bowels. There prevail such diseases as cholera infantum, diarrhœa, bowel complaints, — what people understand as summer complaint, both of children and of old persons. But this influence is by no means confined to the extremes of life. It is felt by persons of all ages in a greater or less degree. The power to resist the influence of diseases, which are around us everywhere at all times, is certainly diminished at all ages, and with persons of all degrees of strength by impure air, by the habitual inhalation of impure air. The application of these general principles to the case in hand is this: the population require open spaces for the mixture and diffusion of pure air with impure air, for it is by this process that impure air becomes pure, through the diffusion and mingling of the two. Therefore, it is found beneficial to the health of all crowded communities to have open spaces whether of land or water. The peculiarity of the influence of this open space upon the health of Boston lies in the fact that it is of great extent; that it is on the western side of the city; that the winds, the prevailing winds of summer, the almost constant wind of extreme hot weather, comes over it. It strikes the city purified, freshened, cooled upon its whole western side, and I think there can be no doubt that its influence is felt over the whole territory from Dover street to Copp's Hill. This influence is diminished as it passes over the city. It may be less in certain conditions of the wind, but I should think with a strong wind, that its influence for good cannot be entirely lost, until it strikes the harbor on

the other side of the city. I have lived in Charles street for three years, and I know the temperature. I know, in the first place, that the wind there is extremely pleasant in summer, almost as good as we find in the country. I know that the temperature is from three to five degrees lower in the summer months at my house in Charles street than it is in Washington street; I should say an average of four degrees during the months of July, August, and September. For these reasons, I should greatly regret the limitation or material abridgment of this water-park, which I consider of the highest sanitary value.

Q. Have you, doctor, ever examined the statistics as to the health of the inhabitants on the borders of this locality?

A. I have, sir.

Q. How does it compare with other localities?

A. I have not recently, but I did two years ago make a comparison. The mortality of Ward 6, the death-rate of Ward 6, was only half as great as that of Ward 2. But this is not entirely due to the Charles River. We know that Ward 6 is occupied in part by persons who are capable of taking better care of their health; but it also includes a very crowded portion of the city north of Beacon Hill.

Q. (By the CHAIRMAN.) What is the comparative mortality of that portion?

A. I cannot answer the question.

Q. (By Mr. INGALLS.) There is a portion Joy Street and its neighborhood that is very much crowded?

A. Yes, sir.

Q. More so than Ward 2 is?

A. I should think quite as much so.

Q. (By Mr. DERBY.) It includes very much of the colored population?

A. Yes, sir.

Q. (By Mr. INGALLS.) Do you remember the mortality of that portion of Ward 6?

A. It is not readily got at; you cannot pick it out from the mortality of the ward.

Q. Now, would the same effects follow upon any substantial reduction of this water area?

A. Undoubtedly, of any substantial amount.

Q. (By the CHAIRMAN.) You mean the effects would be similar in proportion to the amount filled up. You do not mean the same if you filled five hundred feet from Beacon street as if you filled only fifteen?

A. No, sir.

Q. Do you know much about the population on the northern slope of Beacon Hill?

A. I do, sir.

Q. Have you ever compared (you say there are no statistics you could get) the health of the people there with the health of the same class of people in other parts of the city?

A. I have no means of giving a definite answer to that question.

Q. You have no doubt that there is a large, poor and dense population that is greatly benefited by this?

A. No doubt of that, sir.

Q. No doubt whatever of that?

A. No, sir.

Q. You know it is not only the health of the people who live on the borders of the river and who can afford to leave town in the summer, but the health of the poor classes who live in town the whole year round is affected by it?

A. I think the health of the whole population of Boston, north of Dover street is affected by it.

Q. If half, or a large portion, of these flats were filled in, and they were laid out as a pleasure ground do you think the air coming over that pleasure ground would have as beneficial an effect as the air coming over and being cooled by this tidal water?

A. I am inclined to think not. I am inclined to think that the open water unobstructed by trees, giving the wind free sweep, would be more beneficial to the health of the people than a park.

Q. Does not the wind coming over the sea water, that comes in and goes out twice a day, — does not the wind coming over a large basin filled with it, get much cooler than it would coming over a finely ornamented piece of ground?

A. No doubt of it.

Q. On account of the cooling effect of the water?

A. Yes, sir.

Q. Have you ever noticed anything injurious or objectionable, any effluvia or smell from these flats at low water?

A. I cannot positively assert that the smell which I have perceived has come from the flats.

Q. Take about the time just before the turning of the tide?

A. I cannot say positively whence it comes, but I have perceived, at rare intervals, my attention having been specially directed to it for two or three years, — I have perceived air more or less impure, more or less tainted with decomposing matter coming from Charles River, but whether from these flats, or from the openings of the sewers, I have never been able to satisfy myself entirely.

Q. How long are the flats really bare every day? Do you know how long, in an ordinary tide?

A. I could not give a positive opinion about that.

Q. Whether or not you think that that present basin of two or three thousand feet, part of which is bare at low water, is not better and more beneficial to the city than half that space of deep running water would be, no matter what other defects there may be?

A. I do, sir.

Q. (By Mr. BIRD.) You said you considered the air of

Charles street almost as good as you would find in the country; why is it not as good? I mean with a westerly breeze?

A. Because of the crowded population.

Q. But the air strikes Charles street before it touches that crowded population?

A. No sir; it has to pass over two or three hundred feet of inhabited land before it reaches my house in Charles street.

Q. (By Mr. DERBY.) You live in the bend of the street, at a distance of several hundred feet from the water?

A. Yes, sir. Moreover, the influence of the streets I cannot get rid of.

Q. (By Mr. BIRD.) I understood Dr. Holmes' testimony was that the air is better than in the country, or equally pure.

A. I don't think it is. I think it is very pure.

Q. Equally pure, isn't it?

Mr. DERBY. Dr. Holmes is within one hundred feet of the water, and Dr. Derby within four or five hundred feet.

WITNESS. The influence of the streets alone is sufficient to make the country preferable to me; the decomposition of horse-manure in the streets, the dirt which is allowed to accumulate in all the streets of Boston, which, in the summer months is undergoing constant decomposition, is something you cannot get rid of in Boston.

Q. What, if any, is the difference of temperature, say, in Charles street and Brookline?

A. I can't say, sir. I can compare, I have often compared it with down town, Washington street; that is, with the newspaper report in the *Transcript*. I don't know how it would compare with Brookline.

Q. (By Mr. HILL.) These observations to which you have testified were made long before there was any talk about filling this section?

A. Oh, yes, sir.

Q. (By Mr. BIRD.) I wanted to ask you whether or not you consider that the westerly breezes blowing over these flats in

Charles River, whether they are not affected by the deposits from the drainage and sewerage of Back Bay, etc ?

A. I have the impression that they must be at low tide.

Q. Then the question whether it would be an improvement or otherwise to fill up a portion of these flats you are not prepared —

A. Oh, yes ; I am quite prepared to say that it is better as it is now.

Q. Better to have them remain as they are than to have a portion of them filled up ?

A. Yes, sir ; because they are covered most of the time.

Q. Would not the same opinion apply to the filling of Back Bay ; would it not have applied to the filling of Back Bay twenty years ago, when that was proposed ? Was it not just as essential for breathing area, for the lungs of Boston, that the water should continue to flow over Back Bay as here ?

A. The condition of things I was not so familiar with.

Q. There was a large territory of seven or eight hundred acres.

A. My attention was not directed to it.

Q. There was a large area of six hundred acres, over which the tide ebbed and flowed twice in twenty-four hours. I understand your testimony would lead to the result that it would have been better for the health of Boston to leave that open ?

A. I don't feel ready to express an opinion upon that, because I am not at all familiar with the conditions.

Q. Are not the conditions similar ?

A. I don't know whether they are or not ; my attention was not given to that matter.

MR. BIRD. The logical result of your testimony seems to me to be to put Boston into a straight jacket, and not allow any more change in this direction.

MR. SHATTUCK. That is our theory.

WITNESS. I think any material abridgment of that water area would be bad for the health of Boston.

Mr. SHATTUCK. The committee may or may not be aware that there was a project which was earnestly advocated by many intelligent people in Boston, in opposition to the filling up of the whole of the Back Bay. It was thought there ought to be a large water basin left in the middle for pure air. The commonwealth, however, decided, influenced I suppose somewhat by the expectation of profit, that they would take the whole of that water basin, and that is an additional reason why the commonwealth should not fill up any more. The reason I allude to this is as preliminary to the introduction of a letter written by Governor Andrew, who has been alluded to here upon that subject, which bears, almost every word of it, upon this investigation, and confirms the statement made by Dr. Holmes as to Mr. Andrew's views. This was written in favor, earnestly advocating the reservation of a part, a large part of the Back Bay; for an open water space, in addition to this existing Charles River basin.

The letter referred to was read by Mr. Hill, as follows :—

BOSTON, March 10, 1860.

TO GEORGE H. SNELLING, Esq. :

My Dear Sir : I have neither been unobservant of your efforts, nor indifferent to their success, although I have not been present at your hearings before the legislative committee, concerning the Back Bay and the Common. And although the presence of any friend and the least assistance might be grateful to you, I am sure that the cause of the public health, and the preservation of the beauty, cheerfulness and scenic charm of Boston Common, — now in the process of ruin — all have in yourself an amply faithful, able and zealous advocate. We have frequently spoken together, during the last twelve months, on this threatened and already half-accomplished destruction of the feature which lends to Boston Common its characteristic beauty, and imparts to Boston herself one of her most important securities for the health of her people. Indeed, I confess that in the careless in-

sensibility to danger, common, I suppose, to most of us, I was unmindful of what was impending, until you pointed out the coming evil, and its possible prevention. Let him be blind who will; nothing but the will to see is now wanting to any man who has an eye in his head, and in his mind. Your memorial, printed with the "Senate Documents" of last year, contains the substance of the whole case, which admits of little enlargement or illustration. I have recently perused it again, and with new impressions and fresh convictions. I write this hasty note to assure you of the hearty sympathy I have with your labors, and the gratitude due for the intelligent philanthropy which directs them.

I wish the legislature could have a fortnight's session here in August; or might spend any considerable time in Boston during the summer weather, and thus be led to observe how great a blessing (and to many thousands) this ancient Common is, merely regarded as a retreat from the closer quarters of narrow streets, crowded houses, huddled buildings and humble alleys, whence thronging populations emerge to refresh the eye, the blood, the lungs, the cheek; yes, and the fainting soul itself. Members would then perceive (what *we* do so clearly) that not merely to its own fifty acres of greensward, pathway, pond and foliage is due the renovating power and influence of "*the Common*." Whence come those soft and cooling breezes? What gives the sense of freedom and enlargement, as the landscape opens? Why is the Common always new and inexhaustible? Those who know not now may one day learn — too late. And thus it is: Worcester and Berkshire fan it with the airs from their broad lawns and hillsides. The constantly renewed waters of the bay cool them as they pass.

The waters themselves; the hills of Norfolk, just beyond them; the free, open sky; and all the variety and beauty and vastness of the landscape, as you look from Beacon Hill to the sunset, combine to create and complete a scene in which Nature pro-

nounces a visible benediction, *felt*, though unheard and indescribable.

Shut out those flowing, though quiet waters; build up row upon row of brick or stone for dwellings; people the space now open for the air and sunshine to drift through; cut off that open prospect; and the ten thousand toil-worn men and women and their children, whom we often see of a summer Sunday afternoon thronging the Common, and tasting of its beauty and its streams of life, suffer a bereavement for which no compensation is promised them, and for which nothing but a miracle could compensate.

With a hope yet that we have not for the last time seen the Brookline hills,

I am very truly and faithfully yours,

JOHN A. ANDREW.

At this point, the hearing was adjourned to three o'clock.

AFTERNOON.

The committee met at 3 o'clock.

Mr. ALBERT BOSCHKE (recalled).

Q. (By Mr. INGALLS.) Mr. Boschke, let me ask you about the surveys of Boston. When was the earliest survey made that we have?

A. I believe an English survey by the admiralty — that is the first map or survey of the harbor; but I don't know the exact date.*

Q. A hundred years ago — about?

A. Yes, more than that.

Q. Let me ask you whether this has been found to be true; that wherever the speed of the water that passes through the harbor has been reduced, there has been shoaling, and

* Des Barres Map of Boston harbor, 1775.

wherever the speed has been increased that the harbor has been made deeper. Is that so?

A. Yes, sir, in Boston harbor.

Q. In Boston harbor that has been so? Now will you illustrate that by example, if you please. Take it off India Wharf, will you state how it is from the earliest survey, and how it is now?

A. By illustration with a map I could, I believe, be clearer than merely —

Q. If you can describe it first, it will be better, because in reporting or listening it will be better. State it first, and then illustrate it with the map?

A. The greatest evidence of it exists in the mouth of the Charles River. The contractions of the shore have created a deepening.

Q. When you speak of the mouth, what do you mean?

A. That part between the north end of the city of Boston and the city of Charlestown.

Q. The narrowing of the channel has made a swifter current and made it deeper?

A. Yes, sir, and has transported that material to other localities, and deposited it there.

Q. That is the main question of accelerating the velocity of the water. Now, as to the reducing the velocity, what is the effect?

A. We find that after the currents leave these contractions and expand over other fields, they lose their velocity and deposit their material.

Q. Now, will you illustrate that?

A. That is, after the currents have left the narrow passage between Boston and East Boston, they have expanded over a large territory principally formed by the South Boston flats. And they have there lost their velocity, and the burden of the water carried has been deposited there. In other instances, it

is discharged by the South Bay waters. After the Boston Wharf was built out, it became very apparent that the current of the South Bay discharged more in the form of a stream than formerly; for the building out of the Boston Wharf formed two embankments, which there formerly were not. The waters of the South Bay discharged directly over the South Boston flats. Now, they are compelled to flow along the shore of Boston. They are checked at a point where this current meets the main current of Mystic and Charles Rivers. Under the angle where the current of South Bay was checked, eddies were formed, which caused the growth of South Boston flats in the direction of this channel, in front of India Wharf to a considerable extent.

Q. What change has taken place in front of India Wharf? You spoke of the water as it was formerly; what is it now?

A. There was a direct course. Vessels could leave from India Wharf direct for sea. Now the South Boston flats have extended into a point in front of India Wharf, and also of Central Wharf, and shoaled the water to that extent that vessels cannot leave as formerly. They have to go towards Long Wharf before they can enter the main channel.

Q. How long has this been going on?

A. It has been quite apparent between the surveys of 1835 and 1861.

Q. Then how has it been in Charles River? Originally, how was the depth of water, beginning, say at the foot of Beacon street, the corner of Beacon street and Charles street, and coming around to Fort-point channel? Was it deep water all the way?

A. Well, the surveys, as far as we have the surveys — down to 1835 — show the condition of the mouth of Charles River or this estuary. But if we look on the map of this English survey, before a survey was made on the shores of Boston and Charlestown and Cambridge, we find that this arm of the sea had considerable depth of water already, originally, before

it ever was settled. And it would have been a wise policy to have left this water front on the north side of Boston open for purposes of navigation, instead of obstructing it with bridges; because on that side we have our best and deepest water front, which has been cut off by the bridges; for the purpose of navigation it was unwise.

Q. As I understand you, the filling up of old Back Bay, which was done practically about 1821, and then obstructing the flow from the harbor, in between the bridges, between Charlestown and Boston, retarded the flow between Craigie's bridge and Cambridge bridge, didn't it?

A. It didn't retard, because at the same time you contracted the shore; and instead of retarding you accelerated the flow, but it diminished the volume of water for the lower harbor.

Q. Well, now, how is the filling of the lower harbor? How has that been affected by this reduction of the tidal basins?

A. Well, in making comparisons and figures, we evidently see that the main channel between Long Wharf and Governor's Island is the main roadstead for our vessels that has suffered. Grouping these figures, it is apparent to the eye where the scour has operated and where the deposits have taken place; it is evident from this illustration where the injury is really going on, and even with the present *regime* of the harbor. If we disturb that further, the evil will increase; because at present this material has been brought there and left in this locality, which is our main anchorage [map shown to the committee, and explained in detail.] In grouping these soundings, I express the plus and minus in blue and black ink; in grouping them together it is easier presented to the eye where these lodgments of material have taken place, and where the bottom has been dug out by the current and where the scour has taken place.

Q. (By the CHAIRMAN.) When was the filling up of Back Bay commenced?

A. I believe it was commenced in 1820.

Q. (By Mr. SHATTUCK.) Well, now, let me ask you how it is with other harbors? After the country behind in the rear of the harbor that is kept open by the rivers has been cultivated, and after a city has been built upon a harbor, unless you keep open the tidal reservoirs, what is the effect?

A. It will uniformly fill up, and from two sources.

Q. It will fill up from two sources. What are these two sources?

A. They are from fresh waters, and from densely populated cities.

Q. Without a tidal basin behind a harbor, is it physically possible to keep open a harbor unless by artificial means,— by dredging?

A. I believe not.

Q. Do you know cases where harbors have been filled up where the tidal basin has been cut off?

A. We have none in the United States, but I believe there are several instances in England and France where such injuries have taken place. We have harbors without tidal basins.

Q. We will come to that; but have we any cases where harbors have been filled up when the tidal basins have been cut off?

A. Yes sir, they have been filled up, and I believe in some instances parliament has had the deposits removed.

Q. (By the CHAIRMAN.) Excuse me. Where are the harbors that have been injured by the cutting off of the tidal basins?

A. There are several harbors. I believe the river Dee, for instance, where they have placed embankments, or placed tidal gates and bridges in their openings to keep the tide out, and the consequence was that immediately the deposits took place and they were removed.

Q. Where is that?

A. In the river Dee.

Q. In Scotland?

A. Then in Rye harbor there is the same case.

Q. Where can we find that?

A. There is a very full history of these cases in the report of the commissioners on tidal harbors, appointed in 1844, in England. There are numerous cases given.

Q. Is that the name of the book?

A. It is in 1844, and a copy can be laid before the commission if they desire.

Q. We would like it.

A. I am not able by memory to state the facts in each case and give you a true history without making mistakes.

Q. (By Mr. SHATTUCK.) Now let me ask you if there are any harbors in this country that are used without tidal basins; and if there are, what has been the effect of the increase of cities and the cultivation of the country in the rear?

A. The best illustration I can think of is Baltimore.

Q. Has that any tidal basins?

A. It has no tidal basins, but it has a very small creek or water-shed. And the consequence is, that dredging machines are relied upon solely to keep the basin there.

Q. How many are employed there constantly?

A. I believe they have usually three.

Q. How large is the harbor of Baltimore, as compared with the harbor of Boston?

A. The actual harbor, the basin to which we refer, is quite small. I do not think it is more — it would not be more than one-fifth of our roadstead in Boston.

[Explained in detail in reference to the map.]

Q. Let me ask you about dredging. You say it is about one-fifth of the tidal reservoir of Boston harbor. What amount of dredging would be necessary to keep them open?

A. It is almost impossible to say. But if you relied upon dredging, you would employ a great number of dredging machines, and that would itself obstruct the harbor.

Q. Take one dredging machine; how much land does it occupy?

A. It occupies the water.

Q. I mean, how much water?

A. It takes about two acres to operate a dredging machine, with scows surrounding it. That is not the only obstruction; these have to be towed away. The train of scows behind goes almost across the harbor.

Q. You have had experience in dredging?

A. Yes, sir.

Q. Now, in your judgment, would it be practicable to keep open Boston harbor by dredging, to say nothing of the expense, without causing serious obstruction to the commerce in the harbor?

A. If Boston harbor had no tidal reservoirs, I think it would be a very serious affair, and you could hardly rely upon dredging alone to keep the harbor open.

Q. How many would it take?

A. I suppose it would take a dozen machines, going all the time.

Q. At the rate it is necessary to dredge in Baltimore — and there is no reason why the deposit of silt is not as great in Baltimore as it is in Boston harbor?

A. I think it would be a little more in Boston harbor, because there are two fresh water rivers. There would at least be a greater proportion than in this creek that empties into Baltimore harbor, and that freshness would bring considerable silt into the harbor of Baltimore, though we have considerable freshness here.

Q. Take other harbors where there are no tidal basins, will they keep open?

A. No, sir.

Q. If you had only fresh water, could the harbor be kept open without dredging?

A. I believe not.

Q. Will you take every instance that occurs to you, commencing without a tidal basin, and state what process is going on in it? You need not go into all the little ones, and give all the particulars, but whether it is generally the case that (generally) where there is not a large surface of water behind the city the harbor fills up. You may illustrate. Take Mobile harbor; how is it?

A. All these cases are peculiar in their features; not exactly like Boston harbor, if it was deprived of its tidal reservoir. For instance, Mobile harbor, near the city where the Spanish river enters upon it, is different from Boston harbor, and yet it establishes this, that the river brings down silt, and where the river terminates in Mobile Bay it fills up. And so with other small rivers that terminate in the sea. They all gradually silt up to a certain degree in which the cross section is sufficient to the amount of water that comes down. It will never entirely close.

Q. Then take Ipswich harbor, in Massachusetts. How is that?

A. It has also a tidal reservoir.

Q. It has?

A. And that is what keeps it open. I do not remember just now any instance where we have a harbor without any basin except Baltimore.

Q. How is it with Portland harbor?

A. Portland has considerable tidal reservoir.

Q. (By the CHAIRMAN.) How is it with Salem?

A. Salem has no tidal reservoir, and it is silting up so that not even fishermen can get in.

Q. (By Mr. SHATTUCK.) How long has that been filling up?

A. I believe the decay of Salem can be ascribed to its harbor filling up.

Q. (By the CHAIRMAN.) Have you any surveys that show it?

A. Yes, sir; within three years I have surveyed part of the front around Salem with a view to this; there was a petition, from the Chamber of Commerce, calling upon the United States to send dredging machines there and dig out the harbor.

Q. A survey made within three years?

A. Within three years.

Q. What is the date of the survey that you compared it with?

A. I do not know how long ago the coast survey was made; I believe it was in 1845. There was a little more water. But I understand that once Salem had quite a commerce.

Q. (By MR. SHATTUCK.) Is there any evidence there from persons that have used Salem harbor for commerce?

A. That is all I have; but at present I find only four feet around the principal wharf, Derby Wharf, I believe it is called.

Q. That is filling up?

A. Yes, sir.

Q. What did they state to you in regard to that?

A. That the harbor was in a condition that they could not get any vessels there, and desired that the commissioners should survey it, and assist them in getting improvements made.

Q. They said it had been filled up?

A. Yes, sir.

Q. Well, then, Portland harbor has a large tidal reservoir?

A. Yes, sir, Portland harbor has a considerable reservoir.

Q. How is it with Providence and other cities?

A. They all have considerable back water.

Q. Do you know of any harbor that is not filling up that has not a tidal reservoir, unless it is kept open by dredging?

A. That is, as far as my knowledge goes: I do not know of any harbor that is kept open from any other cause than from the scouring power that is supplied by tidal reservoirs. Where they are wanting, there is always evidence of their filling up; and that can be illustrated to any amount if time can be given to me to examine, and gain the information.

It strikes me a harbor about Toulon is filling up from similar cause, and they employ dredging machines there to almost any extent. But to give proper evidence, of course I must have time allowed me to investigate. But for this case they are not fresh in my memory.

Q. What is the cost of running a dredging machine a year?

A. You mean the actual expense, or what persons would charge to work a dredging machine?

Q. What persons charge to work a dredging machine, I suppose.

A. Between thirty and forty thousand dollars to work a dredging machine.

Q. What is the actual expense, not including the wear and tear of machinery and insurance?

A. Twenty thousand dollars.

Q. (By the CHAIRMAN.) What do you mean, the working it?

A. The working the machine for a year.

Q. Does that include a depreciation, and wear and tear of machinery?

A. No, sir. The person using a dredging machine must earn forty thousand dollars in order to make it an object.

Q. And that includes scows and all, of course?

A. Yes, sir. It includes also running repairs, which are quite large.

Q. (By the CHAIRMAN.) It does include repairs of machinery?

A. The temporary repairs, yes, sir. Dredging machines will unfortunately break down every little while, and there are constant repairs.

Q. (By Mr. SHATTUCK.) And is that included?

A. That is included. It includes labor and coal, and everything but depreciation and interest on capital.

Q. I suppose a dredging machine will last four or five years?

A. A dredging machine will last six years.

Q. What does it cost with all this?

A. From forty to fifty thousand dollars.

Q. (By the CHAIRMAN.) Does that mean such as yours, or such as the city of Boston use?

A. Such as the city of Boston use; mine cost a hundred thousand dollars.

Q. Those used by the city of Boston cost twenty thousand dollars?

A. Yes, sir. Those are the machines usually used in the United States.

Q. And you think a man ought to make a profit of fourteen or fifteen thousand dollars a year?

A. Yes, sir.

Q. (By Mr. INGALLS.) How much will these machines dredge in a day, how many yards?

A. The city machine dredges from four hundred to four hundred and fifty yards a day.

Q. What is that worth? If it is wanted for filling, what is that worth a yard?

A. I have some contracts where I get thirty-five cents a yard, but this is material that has only been introduced lately by myself, and I of course expect to make some profit. Formerly, it has been wasted.

Q. Whether in keeping open Boston harbor it would be practicable to use the dredged matter?

A. After other resources are exhausted, of course it will be then a question how to dispose of it.

Q. (By the CHAIRMAN.) Then you make the cost of a machine twenty thousand dollars a year; depreciation, seven thousand dollars; that is twenty-seven thousand dollars; and you can make for this material forty thousand dollars. That is a pretty good business.

Q. (By Mr. SHATTUCK.) You have given the best day's work;

let me ask you, taking the run of the summer, what it would be?

A. You do not take three hundred and sixty days. Two hundred days is the maximum number of days for dredging, and out of that you must deduct for bad weather. We work only eight months of the year.

Q. (By the CHAIRMAN.) But we are talking of machines up here in the harbor.

A. I know, but they freeze up.

Q. (By Mr. SHATTUCK.) So that practically —

A. A hundred and eighty days is practically the number.

Q. One hundred and eighty days is about all you can do in the year. Take an average, you say four hundred yards a day; that is a fair day's work?

A. Yes, sir.

Q. What is the average?

A. Well, that is what it ought to do in a hundred and eighty days.

Q. Does anybody ever do that, take moving about and everything?

A. I believe four hundred yards for a hundred and eighty days in a year is a safe estimate.

Q. You filled in Atlantic avenue with a part of this?

A. No, sir. That is going to be filled from Fort Hill.

Q. Has there been any narrowing between Craigie's bridge and West Boston bridge?

A. Yes, sir.

Q. How much?

A. It is shown on that plan before the committee, but I have other plans which I can refer to which show more strictly. Mr. Chairman, here is a plan of Charles River in 1835, as far as the survey goes, which is a very good survey as far as the survey is given. I reduced that from actual surveys. You find deep water reaching up to West Boston bridge. This is the eighteen foot curve here [indicating upon the map], and the twelve foot

curve goes beyond West Boston bridge way up to the "Old Ladies' Home." And the six foot curve is out there [indicating upon the map]. Now, I will bring the plan of 1861, and show how it has worked in that short period. Mr. Chairman our comparison gives 840,000 cubic yards in this locality, this being the same locality as the West Boston bridge. The twelve foot curve does not come to the West Boston bridge.

[Witness here entered into a detailed explanation of the maps.]

Q. (By Mr. KIMBALL.) How is it about Provincetown harbor?

A. I believe in the immediate vicinity of Provincetown it is filling up. Have you seen the results of the investigations made in the last two years by the United States government?

Q. That is merely a change of the back shore.

A. The harbor is really filling up. Provincetown harbor is not safe at all.

Q. (By Mr. SHATTUCK.) And so you are filling up the South Boston flats; on what ground?

A. We want additional scouring.

Q. And the first plan of filling up was not so much for the purpose of filling up, but to concentrate the scouring, if I understand?

A. Yes, sir.

Q. When was that plan presented?

A. I believe in 1861.

Q. So that the project was one for the harbor improvement, and not a land speculation?

A. No, sir. The filling in was not commenced before 1863. And several gentlemen came before the harbor commissioner, and suggested the advantage of giving up the harbor basin, and giving up this basin for the purposes of the harbor. The idea of filling up the South Boston flats is, I believe, very old.

Q. You give, as I understand, as your opinion, that no harbor can exist without dredging or scouring, either one or the other?

A. Yes, sir.

Q. And you think that the tidal basins of Boston harbor are small enough, according to all testimony?

A. Yes, sir.

Q. And therefore they do not need to be reduced, any of the tidal basins?

A. Not a bit reduced. I have the map showing the condition of Boston near or before the period of its settlement, and this will show you [producing it] how much inroads have been made on Boston harbor. And the green surface shows the land before the settlement of Boston. The encroachments which have been made up to the present date are in the dark shaded surface; and the red surfaces are areas which are destined to be reclaimed, either the grounds common, or the lands owned by the riparian owners. That is the harbor commissioners' line. The dark line shows what is to be stolen. And if you do not say, then, that there have been inroads made on Boston harbor—

Q. (By the CHAIRMAN, interrupting.) I suppose your theories would have required two hundred years ago that Boston should have remained as it was?

A. I beg your pardon. I don't think it would, to that extent.

Q. Do you know what is the whole aggregate of filling?

A. It is more filling than Boston originally contemplated. I think it is about fifteen yards within the harbor commissioners' line.

Q. And the area of solid land here on the peninsula was at that time —

A. Was about six or seven hundred acres of peninsula. I think this makes a very handsome exhibition of the three stages. Evidently, gentlemen, there is a demand here for the making of these reservoirs. They are all streams now.

Q. (By Mr. SHATTUCK.) Let me ask you what is the depth,—judging by the measurements you have made of the depth of mud in certain localities on these flats, these tidal basins? What do you think is the depth of mud in the deep parts?

A. I have made soundings for the sea-wall on the corner of Beacon street and Charles street, and I have found there from thirty to thirty-five feet of mud.

Q. Well, now, judging from analogy, what would you say it would be?

A. The wall has been built up here on this shore. In the wall that has been built on this shore in front of Charles street, they had great difficulty in making the walls stand on account of the great depth of mud. Some of these walls are now in a state of tumbling down; and the wharves proposed by this would have cost one hundred and seventy dollars per foot.

Q. When the plan was got up, the plan was considered one hundred and seventy dollars a foot?

A. Yes, sir.

Q. Now, what do you think is the depth down there, probably [indicating on the map]?

A. I have no reason to believe that this is a deep basin all through. And another evidence in this channel is the twenty feet road.

Q. (By Mr. KIMBALL.) Speaking about the depth, here is the commissioners' line on one side [indicating upon the map] and here it is on the other. Now, what do you suppose from your knowledge of the soundings the depth of mud is,—around where the wall is, I suppose that it is solid up to there?

A. I cannot tell here [indicating], but up here in this locality we have a depth of twenty feet at low water, where there are scows.

Q. Well, all the way along down here, what should you think was the depth of mud?

A. I really cannot tell.

Q. Do you know what the bottom is there?

A. There is mud on the surface.

Q. Do you think that there is all along there more than a foot or eighteen inches of mud?

A. I don't think on the flats there is much mud.

Q. (By the CHAIRMAN.) On the channel here?

A. On the channel, I think there is considerable mud. As I say, here is a place that is twenty feet at low water, where the mud is washed out. That is the only evidence I have. Here I have sounded, and I know.

Q. Now, Mr. Boshke, you have assumed, I see on that map there, and you do assume, that the Cambridge shore is to be filled up to the commissioners' line?

A. Yes, sir.

Q. Do you think that can be done without injuring the harbor?

A. I have suggested to the harbor commissioners to place a draw in that harbor line.

Q. You would remove an ancient landmark?

A. You would move it in.

Q. Is that so in accordance with the tendencies of that day?

A. Yes, sir.

Q. Now, is it a fact that if the harbor is filled up the same amount that the tidal basins are that it would be affected?

A. If you would preserve the tidal basin to its present extent. I do not see that the harbor is to be affected in any way; but I believe that the tidal basin is as small as it ought to be.

Q. (By Mr. KIMBALL.) You believe that the tidal basin is as small as it ought to be? Now, suppose that an arbitrary basin were laid out a thousand feet wide, and the Charles River is filled up as far as the tide goes, up as far as Watertown, and that it should be dredged out and widened, we will say five hun-

dred feet here, [indicating], and you give us area enough to flow the harbor, would you injure the harbor?

A. On the contrary, you would gain. It would make no difference. I would rather see the tidal reservoir removed a little further up. If you take it and transfer it further up, you would not injure the basin.

Q. (By the CHAIRMAN.) Now, suppose we should gratify our Cambridge friends by not interfering with them, and say that these flats should remain there forever, but we are going to leave that for a tidal basin; then, suppose we add to that by dredging here another million cubic yards; then we have got the same tidal basin, have we not?

A. I do not follow you precisely; you cannot dredge here a million yards of the tidal basin, because it is all covered at low water. You must dredge here between high and low water.

Q. Then upon your theory of harbors, if you preserve the main channel, it don't make any difference whether you fill up in one way or the other?

A. For the benefit of the harbor it makes no difference, exactly —

Q. Well, sir, you think if you carry the tidal basin up, it is better for us?

A. If you don't carry it too far. There are certain proportions in which Boston harbor is favorable. If you go too far, a discharge will meet the incoming tide.

Q. If you should only build up to the cross dam, and excavate enough here [designating on map] to compensate, then the effect is just the same?

A. Unless you did not do too much.

Q. I only ask, supposing you filled up only to the cross dam?

A. Just the same.

Q. (By Mr. SHATTUCK.) In other words, you mean to say simply that if they keep the same amount; I do not understand you to say that there is the same capacity in this place or that

place for holding water, but you simply say here, in general terms, if the tidal basin is preserved as large as it is now, so as to have a sufficient channel here [referring to map], it does not injure it.

A. No, sir, of course if you do not scour the harbor too much. We want to preserve this channel.

Q. If you increase the width and the depth, it would be made better?

A. Yes, sir, if you increase the width and the depth.

Q. (By the CHAIRMAN.) I suppose it is universally admitted that the condition of the harbor is as good at the present time as it has been in any period in the past?

A. I most solemnly protest against that. Here they come every time that anybody wants to fill up any flats, and they bring up such testimony, and they summon old pilots that never have made any accurate examinations, nor have gone into any nice measurements, but are men that have sailed a craft of six hundred tons, and have not touched bottom; and they come here and will tell us here, "Oh, yes, Boston has just the same amount of water"—going only by guess. Here we have figures. Why, has the United States and the City of Boston to get accurate surveys, and shall we act on hearsay? Here we have tables of comparison, and the committee see that there is not only a surplus filling and shifting.

Q. I do not mean as to the shifting, the causes of which cannot be traced; but the fact is, that the amount of matter in Boston harbor which represents the increase is mathematically almost the same.

A. I beg your pardon. Will you be so kind as to read the foot note upon the opinions you yourselves express? But if you take into account the extent of the flats, it is not the same.

Q. That is all we are concerned about.

A. It was a deposit, and a reduction of the depth in the main channel which is injurious to navigation.

Q. (By Mr. SHATTUCK.) Isn't it quite as bad, the effect upon the harbor, by shifting material as it is by new material?

A. Certainly. If you take the scour that has been taking place in the roadstead and reduce the depth, isn't it just as bad as if it had taken place there?

Q. Let me ask you as to this silt that has been deposited on the flats when you get the flats filled up, the natural tendency will be to have it go into the channel?

A. To have it go into the channel, unless we remove the tidal reservoir. It will remain there, unless we remove by dredging. The South Boston flats will reduce the channel, but will widen also the cross section.

Q. (By the CHAIRMAN.) Well, now, since Boston was settled, the area of the harbor has been reduced about seventy-five per cent.

A. Have you calculated that? Is the encroachment to that extent?

Q. The encroachment of three hundred yards has been added to the land; that is the proportion of the harbor that has been filled.

[City Documents in regard to the surveys of Boston referred to.]

Q. (By the CHAIRMAN.) How far down does this affect the tidal scour?

A. You mean the transportation of material from the upper harbor? It lasts as far as Long Island and Deer Island. It is distinctly traced so far, and I suppose portions of it go beyond that.

Q. You find no traces beyond there?

A. Yes, sir, there are traces found below; but as I have told you, it is difficult to ascertain exactly: but to Long Island and Deer Island it is distinctly shown.

Q. (By Mr. KIMBALL.) How far from the shore?

A. Upon all these flats and some portions of the channel.

In the main channel, the scour is sufficient to remove all the silt, and carry it to the coves and the flats.

Q. Sufficient to detect this identity?

A. It is all of the same character. That is the reason that we cannot trace it to any special source.

Q. (By the CHAIRMAN.) You made some estimates for the cost of a sea-wall for us in 1867?

A. Yes, sir.

Q. I think these plans are yours; there are two adopted by the committee.

A. I would recommend this wall as the cheapest wall for its strength.

Q. Do you remember what that cost?

A. Between sixty and seventy dollars.

Q. (By Mr. SHATTUCK.) That has been rejected.

A. That has been rejected on account of the material, on account of the possibility of the rip-rap embankment settling and injuring the wall on top of it.

Q. (By Mr. KIMBALL.) Now, in regard to this wall, now that the matter is brought up, assuming that line laid down on the map for a five hundred foot channel, and that the mud is upon the greatest part of the length of it, and a foot or eighteen inches in depth from the bottom, and that that bottom is all gravel (which I believe is the fact), what would be the cost of building a wall upon that?

A. I suppose that a wall could be built for from thirty-three to forty dollars.

Adjourned to Tuesday, at 10½ o'clock.

TUESDAY, Nov. 9, 1869.

The hearing was resumed at 10½ o'clock.

TESTIMONY OF MR. T. WILLIS PRATT.

Q. (By Mr. SHATTUCK.) What is your occupation, Mr. Pratt?

A. I am a civil engineer.

Q. You know the localities of Boston harbor, generally?

A. I am somewhat familiar with them. I was born in Boston, and I have been over pretty much all the land and water there is round the vicinity of Boston, during the last forty years.

Q. Do you know anything about the harbor of Providence?

A. Yes, sir, I have lived in Providence, and surveyed and located the railroad between Providence and Worcester, and laid out the Cove.

Q. To what extent has that Cove been occupied by filling up, and by railroads; that is, what proportion of it?

A. I don't know as I can state definitely, at present, what it is. At the time we filled it, we occupied perhaps one-third of the whole.

Q. (By Mr. BIRD.) What do you mean by "we"? The Providence and Worcester Railroad?

A. The Providence and Worcester Railroad. We reserved as a water area an oval shaped pond, 1,400 feet the largest diameter, and 1,200 feet the shortest, bounded by a stone wall. Outside of that there was an avenue, so-called, eighty feet wide all round the whole, dedicated to the public. Beyond that were the passenger stations, freight stations, and workshops of the railroads.

Q. What year was that?

A. That was in 1846.

Q. (By Mr. SHATTUCK.) Has it been filled up any more since, or any more of it occupied?

A. The Hartford and Fishkill Railroad filled up another part, higher up. The part they filled was much more shallow than the part we filled.

Q. (By Mr. DERBY.) What depth, Mr. Pratt?

A. I don't think there is an average depth there of over ten feet, or eleven feet. The Cove was bare at low water always, except in the angle at the bridge, running down into the harbor.

Q. (By Mr. SHATTUCK.) Has any larger proportion of that been filled up than has already been filled up of the Charles River basin; that is, taking into account the Back Bay filling?

A. I can answer from recollection only. I think Charles River basin has a much larger proportion filled than the Providence Cove. I made a survey of the Back Bay in 1833, I think, and sounded all over it, every fifty feet.

Q. Whether, when the borders of a harbor are occupied by a city, it will remain open, without any artificial means to keep it open, unless it has tidal basins of proper depth?

A. I believe not, sir. I have read of a great many ancient harbors that have now disappeared in consequence of not having tidal basins. I do not know that I can call to mind any now, but I have books which will show some of them.

Q. What would be the effect of the reduction of the tidal basins of any harbor, without a corresponding reduction in the size of the harbor itself? I am assuming now that no artificial means are used.

A. If the tidal basins are reduced, the quantity of water that flows in and out by the action of the tides will become less, the velocity of the water as it goes through the harbor will be less and when it reaches a certain point of reduction, whatever sediment is in the water will be deposited.

Q. Do you know how it is with the "lower middle" part of Boston harbor, opposite Central Wharf? Do you know whether the depth has been reduced? Did you hear of the steamer running aground?

A. I think I did hear of it.

Q. I understand that any part of the harbor where the tide flows in and out, may be reduced in depth by the diminution of the tidal basin; is that so?

A. Any reduction of the tidal basins that reduces the quantity of water also reduces the velocity of the water. That

is perfectly plain; that is, when the current reaches a wide space, so that it can be distributed over a considerable width, and then the velocity will become so low that silt will be deposited.

Q. (By Mr. BIRD.) I understood Mr. Boschke to say that there is no silt deposited below Long Island. How is that?

A. I should say that Long Island was the limit of that. Beyond that, we come into the ordinary state.

Q. (By Mr. SHATTUCK.) Whether or not, in your judgment, Mr. Pratt, the tidal basins of Charles River could be reduced with safety to the harbor?

A. I should think not, sir.

Q. Why not?

A. I will call attention to a fact mentioned in the tenth report of the United States commissioners on Boston harbor, fifty-seventh page. There is a table at the top of the page which gives the velocity of the water between Boston and East Boston, at middle tide, or half-ebb, as it is called; also in Nantasket roads; also, in the Hudson River, at New York, and the East River, at New York, at Hell Gate, and in the strait called Kill-van-kull. Between Boston and East Boston, the velocity at half ebb is one mile per hour; in Nantasket roads, $1\frac{3}{10}$ miles; at Hudson River, New York, $2\frac{3}{10}$ miles; East River, at New York three miles; at Hell Gate, $8\frac{1}{2}$ miles; at Kill-van-kull $2\frac{1}{10}$ miles. I will add to that the velocity of the Thames at London, two miles per hour; at low water, $1\frac{6}{10}$ miles; also velocity of the Seine at Paris, two miles per hour. I wish to call attention to the comparative velocity of the current at Boston, and at these other places. It is less than half what it is at either of these places. It almost reaches the point of stagnation. What I mean by that is the point at which it will deposit material. I have a table here which shows what kind of material will resist water at certain velocities; wet ground and mud will only resist water which runs at the rate of one-sixth of a mile per

hour or less. Soft clay will resist water which runs one-third of a mile per hour or less. Sand will resist water which runs at the rate of two-thirds of a mile per hour or less. The water in Boston harbor runs at the rate of one mile per hour. Gravel will resist water which runs at the rate of one mile and $\frac{3}{10}$ per hour. So that the average velocity of Boston harbor represents a material between sand and gravel. If the velocity is reduced one-third from what it is now, sand will be deposited.

Q. In speaking of the average, you mean the average between Boston and East Boston? Lower down, of course, it would be less?

A. Yes, sir. It appears by that that an equilibrium is very nearly established by the present condition of things, or the condition of things when this report was published.

Q. (By Mr. KIMBALL.) When was that velocity of Charles River taken?

A. This was reported in 1866. The time of the observations is not given.

Q. (By Mr. SHATTUCK.) Reducing the quantity of water of course reduces the velocity, does it not?

A. Undoubtedly it does.

Q. State fully, Mr. Pratt, anything else that occurs to you upon the subject.

A. Whatever is held in the water which will produce a sediment, after the current passes through what is called "the straits" in this book, what we call "the narrows," between Boston and East Boston, spreads over the South Boston flats though a portion of it passes through the channel to the East Boston flats, and so around Governor's Island. The current is dispersive, and the sediment is undoubtedly carried to the flats on the south side of the channel. It is being freed from it by the reduced velocity of the current at that point. I suppose the commissioners, after going over this matter for some time, made up their opinion, which is given on page 84, 10th report: *That*

the upper harbor of Boston could not afford to lose another cubic yard of tide water.

Q. How is it in regard to the practicability of establishing a tidal basin further up the Charles River? Whether there are any marshes there sufficiently extensive and near enough to the harbor to answer the purpose of a tidal basin?

A. It is rather difficult to answer such a question without some calculation; but I think there are not sufficient marshes there to be obtained, that are near enough. Whether they are near enough or not would be a subject of calculation. The river is rather narrow there, and the length of time the water has to come up and come down would evidently have a material effect upon the result. It might not discharge until the tide began to come in, and might meet it near the bridges below, and create a disturbance. I cannot tell as to that without an investigation.

Q. And might meet down the harbor, I suppose?

A. It is difficult to tell where it would meet, unless we know the exact spot, the area, and the quantity of water.

Q. In your judgment, would it be safe to attempt to carry the tidal basin as far up as would be necessary to find the marshes?

A. I think not, I should not think it would be safe without a thorough investigation to determine it.

Q. Would it be possible, with our present knowledge of the subject, to decide as to the effect, with any degree of certainty, of a change like that in the tidal reservoir?

A. It is almost impossible to determine it. The experiment would have to be tried in order to determine it.

Q. Can it, for instance, be determined to-day what the effect would be on the harbor of filling South Boston flats?

A. No, sir, we cannot determine. A quantity of water would be displaced; there would be very much less flow in, and the velocity below would be reduced to some extent. There is no question about that.

Q. And to that extent, it would be injurious?

A. Certainly. As I said before, the velocity in Nantasket roads, the main ship channel, is only $1\frac{3}{10}$ miles per hour; whereas at other places, the velocity is two miles per hour and upwards.

Q. What would be the effect of filling in the Back Bay on the depth of the silt or mud between Craigie's bridge and West Boston bridge, and in that vicinity? And what effect would that have on the channel between there and Charles River bridge?

A. Other things remaining the same, the channel would become more shallow; there would be less water going through there.

Q. There would be a less quantity of water to flow through it, and it would reduce the velocity, and naturally tend to fill up the channel?

A. Yes, sir.

Q. What effect would the narrowing of the channel between Charlestown and Boston, and its occupation by bridges, have on the depth of the channel above, so far as it tended to reduce the quantity of water?

A. That would also have a tendency to make the channel more shallow. It would increase the velocity of the current at that point. It would merely spread into the bay above, and the velocity would be reduced.

Q. And the effect would be to reduce the depth of the channel above the bridges?

A. Yes, sir.

Q. You heard the statement of Mr. Boschke yesterday as to the amount that had been filled, did you not, — 850,000 cubic yards?

A. I have the statement here: "Between Cambridge bridge and Craigie's or Canal bridge, on this small area, there has been a surface deposit of 848,000 cubic yards, which has de-

stroyed a handsome channel existing in 1835, and shown in the second report of the United States commissioners on the condition of Boston harbor, 1860, 11th page. We have here a striking example of the rapidity with which a harbor can be filled up by diverting the current from its natural course, and obstructing the natural flow of the tide."

Q. That was "diverted" and "obstructed" in what way?

A. Since that time, 1835, several bridges have been built, the wharves on both sides extended, the channel has been narrowed, and obstructions put in by these other bridges.

Q. The width of the channel to some extent has been reduced?

A. Yes, sir.

Q. And then the effect of the building of the Mill-dam would extend over a long period of time? Assuming that that was built in 1821, the effect might still be felt in causing a deposit in 1835?

A. I could not say that, exactly. I think the results of taking away so large a piece of water as the Back Bay would be shown in a very few years, and then all parts would get their equilibrium soon; but other causes would remain to produce a diversion.

Q. Has it not proved an invariable rule, so far as you know in Boston harbor, that where the volume or velocity of the water has been reduced, there has been a deposit, and wherever the volume has been increased and the velocity increased, there has been a deepening of the channel?

A. I believe that will be found to be a general rule. The reduction of the basins above the inner harbor will produce another effect, if carried to any great extent. We will suppose them to be filled up entirely, — Charles River, Mystic River, Malden River and Chelsea Creek. We shall then have a basin in front of the navy yard, between that and East Boston and Boston proper, in which the tide simply comes

in as a wave and goes out, the velocity being almost nothing near the bridges. That water will become cold more rapidly than it now does. A large portion of the water will never leave the harbor at all. You might observe a particle of water near the navy yard, and by the time the tide has ebbed, it will not reach Governor's Island; it must then return with the flood. That water, not being changed, will be cold, and at the first "cold snap," as it is expressed, it will be frozen, and the inner harbor would be entirely frozen over. If there were no basins whatever, I should not be at all surprised if it should be frozen over three months in a year. A reduction of the velocity of the water certainly assists in freezing it. Water is prevented from freezing by the rapidity of the current and the great depth of it. If you reduce the velocity, you get no water from the ocean, which is of an almost uniform temperature all the year round; and if you shoal water, it cools rapidly, and when the mercury approaches zero, it is ready to freeze and will freeze. If these basins were entirely obliterated, the effect would probably be, that the harbor would be closed two or three months in the year; and as the water is reduced in volume, and the velocity is reduced, we are approaching that condition of things.

Q. Then of course any substantial reduction of the tidal basin by filling would tend to that result?

A. Yes, sir.

Q. To what extent have you knowledge of the harbors on the coast, and to what extent are you able to say that where there are no tidal basins the harbors fill up, unless they have artificial means of keeping them open?

A. I have no data to go upon whatever. I can merely speak from my own observation and from judgment. New Haven harbor is undoubtedly filling up, and has filled up within the memory of man to a considerable extent.

Q. Has that any tidal basin?

A. It has a very small one indeed. A small stream flows into it, not sufficient to keep it scoured out.

Q. Do you know of any others?

A. There is Norwich harbor. Although that is almost at the head of the river, it might be called a harbor.

Q. As a country is cultivated, the natural effect of it is to fill up the mouths of the rivers, is it not?

A. Yes, sir. The rivers bring down a considerable amount of vegetable matter, and fine alluvial soil, which is carried down according to the velocity of the water. The velocity will carry the minuter particles furthest off; the larger material, sand and pebbles, will be carried to different distances.

Q. Even Cochituate water, when it stands a good while, makes a deposit of silt, when it is apparently perfectly pure to the naked eye?

A. Yes, sir.

Q. Do you know what the cost of filling would be?

A. I could not say as to that, without having some definite knowledge of the depth and area.

Q. I mean, per yard?

A. I suppose it might be done for between fifty and sixty cents per cubic yard.

Q. (By Mr. DERBY.) Is not the cost of that kind of work much higher now than before the war, or at the time the filling was commenced by the State?

A. I do not know that it is, in proportion to the difference between specie and paper currency.

Q. I mean whether, since the suspension of specie payments, there has not been an increase in the cost of that kind of work?

A. I think the contractor has had his prices advanced from time to time. I should say that for general railroad work the prices had been higher during the last year than for three or four years before.

Q. (By Mr. SHATTUCK.) Do you know the capacity of an

ordinary dredging machine? I suppose it depends somewhat on the hardness of the material.

A. It depends upon the condition of the machine. I don't think a very good machine would average, the year round, more than one hundred and eighty or two hundred yards a day, say nine months in the year. I cannot say that I have had very much experience in the matter, although I have had jobs of dredging done.

Q. Do you know to what extent the tide flowed in and out of Back Bay between 1821 and the time it was filled up?

A. I don't think the lower basin was ever filled much over a foot or a foot and a half above low water mark. The flats were bare at low water, when I surveyed them (in 1833, I think it was). Occasionally, the water would be over the flats, and then they would be bare. The range might be a foot and a half.

Q. You know that the full basin is now kept open so that the water flows in and out through the sluice-way?

A. I have seen it when I thought it was kept open. There is now probably a larger flow in of the tidal waters than there was before the Back Bay was filled. When that sluice-way was closed, so that it could not flow out, it would flow in. Undoubtedly the full basin was somewhat reduced by filling in the Worcester Railroad solid, which was formerly built on piles.

Q. The water was not changed there at each tide? The water simply went into the full basin, and was shut in there; and then it only flowed over into the empty basin, and none flowed out except what went out at low tide; and you say the empty basin rose and fell only about a foot or a foot and a half?

A. The operation was to let the high tide fill the upper basin, and then the mills would use the water in the course of business, and draw it out of the upper basin into the empty basin, and then that would run out at low water. I doubt whether there is any more water goes out now than under that operation; but it is impossible to tell without a calculation.

Q. Have you ever given any attention to the sanitary effect of these things?

A. No, sir, I don't feel that I could answer on that subject, except in a general way. On the subject of taxable property, I have this suggestion to make: In filling up a large area of flats, we should make a large number of house-lots. Those house-lots would be in the city of Boston. Suppose they accommodated five thousand people; where would those five thousand people reside, if those house-lots were not filled up? Undoubtedly, in the suburbs. If you bring five thousand people from the suburbs into Boston, you diminish the value of land there and increase it here; or you create land here, and diminish the value of it out there. You take five thousand people out of that market for land. It costs you a certain sum to make this land, and the question is, whether, taking into view the cost of this land and the reduced value of that out there, you really get any more taxable property for the Commonwealth; and if any, how much?

Q. Do you know the cost of filling land like this?

A. No, sir, I do not. I look upon this simply as a transfer of lots from the suburbs into the city. We can get piles driven, I think, for about five dollars a piece. I think the price varies with the extent of the building.

Q. Do you know the cost per foot? Is it not between fifty and sixty cents?

A. I am not aware of that fact.

Q. Now, as to the effect on the piles in the Back Bay now of having the water carried 1,400 feet further from those piles than it now is?

A. If the piles that are now driven under the buildings on the Back Bay were not cut off low enough, the tops of them may become dry and dry rot, or rot naturally. It is necessary to keep them thoroughly moist, and by surrounding them with a

large amount of earth, the moisture may be kept away from them.

Q. Would not the depth at which it would be necessary to cut them off to have them safe, depend on the distance from the open water?

A. To some extent in such a locality as that it would. In the vicinity of high ground, perhaps it would not.

Q. If the piles on Boylston street and Columbus avenue were driven at a suitable depth, and you carry the sea-water out 1,400 feet further from that, the effect of it might be, probably would be, to expose the tops of the piles, would it not?

A. The effect would be to drain them of the moisture, and leave them dry; and in that case, they would rot.

Q. As I understand it, on level land like this, where the tide comes in and goes out every day, the water level is a slope from the high water mark, sloping down as you go further off is it not?

A. It has to find its way through the gravel.

Q. (By Mr. BIRD.) Looking at the report of these United States commissioners for 1860, did you notice that they state the net deposit between Craigie's bridge and Charles River bridge to have been 547,000 cubic yards?

A. Yes, sir, I did notice that; and I am sorry I omitted to read it when I read the other.

Q. And that in 1868 they say there has been a deepening between those bridges of 260,000 square yards instead of a decrease in the depth?

A. I did not notice that. I merely brought it in because it was noticed yesterday. I should not volunteer testimony of that kind. Their statements ought to be taken together; there is no doubt about that.

Q. Is there any similarity between the situation of things in the Cove at Providence and the tidal basins here in Boston harbor? Is there the slightest resemblance, hydrographically or physically, between the two?

A. I don't know that there is, in that matter. I merely answered those questions because they were put to me. The situation of things at Providence is very simple indeed. They have simply one harbor, running up between two sections of the city, and then this Cove at the head

Q. It is a narrow river, only three or four hundred feet wide?

A. It is as wide as a stone's throw down by the steam mill—perhaps three or four hundred feet. At the bridge, it is perhaps one hundred feet wide.

Mr. BIRD. The harbor of Providence is precisely in the same situation as Charles River here, and that is all there is to the harbor of Providence. There is a Cove, covering a small area above the head of navigation, and then there is about a mile of narrow channel, not so wide as Charles River, between Boston and East Boston; and that is all there is of Providence harbor.

WITNESS. I don't know as it is a matter of any consequence any way.

Mr. BIRD. I only want to say, that there is not the slightest possible resemblance between the physical or hydrographical condition of the two places.

Mr. SHATTUCK. The only reason I brought in Providence harbor was, because Dr. Holmes mentioned it, in connection with sanitary considerations; and then the chairman brought up the question as to the amount of filling.

Q. (By Mr. BIRD.) Do you know what was the original area of the Cove?

A. The total area of the Cove, taking all the shallow parts, was 3,880,000 square feet.

Q. That was covered by tide water, was it?

A. Yes, sir.

Q. And you filled about one-third of that?

A. Yes, sir.

Q. Has not a large portion of that Cove been filled in since?

A. I mentioned that the southwest side had been filled in by the construction of the Hartford and Fishkill Railroad. They have made a freight station there, and have perhaps filled in a million feet more. We filled 1,276,000 square feet.

Q. (By Mr. DERBY.) Was it between your land and the shore that they filled in, or between the improvements that you made and the sea?

A. The Providence and Worcester Railroad filled around three-fourths on the margin of the Cove, leaving an oval space of water in the middle. We filled up the angles, so as to reduce it to an oval shape. The Fishkill Railroad filled more inland towards the marshes.

Q. Not between you and the harbor, but between you and the land?

A. Between us and the land. We left an opening of one hundred and fifty feet wide, for the water to pass in and out of the harbor. There is no navigation above the lower bridge.

Q. (By Mr. BIRD.) You make out that more than two-thirds of that Cove has been filled by the railroads. Has there not been considerable filled by the city in the way of ornament, in completing the park?

A. We filled more than three-quarters of the avenue spoken of for the city, leaving them only one-quarter on that avenue [referring to map] to complete. That is eighty feet wide. Only a very small portion was done by the city. They saddled it all on the railroads.

Q. Have you any doubt that the filling of that Cove has been a sanitary improvement? That the change of the Cove from what it was forty years ago to what it is now has been a great blessing to the city of Providence sanitarily?

A. You will understand that this Cove is not occupied by buildings, only locomotives run over it. I cannot say about the sanitary improvement.

Q. It was changed from a mud hole, and a receptacle for all unclean things, to a beautiful walk, was it not?

A. I have no doubt its condition has been improved from what it was when I was there. There were fish houses and all sorts of fish business carried on along the wharf, and on Cove street and Canal street. It was the general locality for that class of buildings. The question had been discussed by the city government, previous to my going there, how to improve and develop the Cove. I told them when I located the railroad, I would show them how. Locating the railroad there made the house-lots opposite so valuable for other uses that the merchants immediately bought them up, removed all that class of tenants, and introduced merchants and their warehouses. That of course improved the condition of the Cove. The sanitary condition is far better than it was before, on that account.

Q. There is a proposition now to fill the whole of it, is there not, leaving only a channel way for the Blackstone River?

A. The sediment coming down from the river has made quite an island in the Cove, which has risen above the surface of the water, and grass is growing on it. I think you can see grass at high water in the Cove at this time; and that has given rise, probably, to the idea of having it filled. The railroads have not station room enough, and the probability is there is a strong pressure to have it filled.

Q. Was not one of the conditions on which it was filled, that this oval sheet of water should be left open, and an avenue made round it?

A. I don't know about the condition being that it should be kept open. The law in regard to the possession of flats there is different from what it is in Massachusetts. The city claimed the entire area, up to high water mark, and they gave the railroads all outside of that oval line [shown on map]. If we would build a wall, and give them eighty feet round the oval, the railroads were entitled to the rest. . Whether there was a

condition attached that it should always remain open, I do not know.

Q. (By Mr. DERBY.) What you filled was the margin?

A. We filled the whole of the inside of that narrow oval [shown on map]. The oval represents the stone wall we built.

Q. The oval you left unfilled remains — $1,400 \times 1,200$ — unaltered?

A. Substantially so. They flattened the curve a little on that side, in order to get a little more room for the track.

Q. How wide is the opening into the river?

A. It was laid out exactly one hundred and fifty feet wide.

Q. And there is a smaller opening there? [Referring to map.]

A. Yes, sir; fifty feet there.

Q. And that area has not been encroached upon except by flattening the curve on one side?

A. That is all.

Q. (By Mr. KIMBALL.) Suppose a channel of five hundred or one thousand feet wide, was made running from the mouth of Charles River up by Brookline bridge and thence striking the Cambridge bridge, and the river widened and dredged out so that the area of this arbitrary channel would hold the same quantity of water that is now held in this basin, would not that be as well for the harbor as for the water to be spread over here [referring to map] and run up to Watertown? Suppose we provide for the same quantity of water above Cambridge bridge by widening and dredging here [referring to map], and widening and dredging Charles River up to Watertown, would not the harbor below be as well as it is in its present condition?

A. If the same quantity of water could flow in and out in the same time, with the same elements, it would be as well. If the water will pass from there down into the harbor and back again in the same time, with the same elements, and with the same force, it would be just as well.

Q. In what time?

A. I cannot tell you. I cannot answer any more. I say, if it has the same effect, it will be just as well.

Q. (By Mr. DERBY.) With the rate of speed you give it, would it not take a longer time to get down to the mouth of the harbor?

A. I cannot tell you, sir.

MR. ALBERT BOSCHKE again called.

Q. (By Mr. SHATTUCK.) A question was put to you last night by one of the committee (a very important and suggestive one), whether, if a channel five hundred or one thousand feet wide (and, of course, it would be of some consequence which) was dredged here [referring to map], and as much space for water obtained by dredging out Charles River between this point and Watertown, that would not answer the purpose? You said, if there was the same space kept open, it would answer the purpose. Now, I want to ask you if you have examined the marsh in the neighborhood of Charles River, so that you can say whether it is practicable to dredge it out up to Watertown, in such a way as to secure the advantages of having these tidal basins kept open?

A. The question is too indefinite. It depends entirely upon the amount that you want to compensate for. Another condition is, the distance to which you go. A third condition is, that the water way, even through this basin, must be proportioned to the outflow to the bridges or to the mouth of Charles River. There are three conditions.

Q. Wont you state them again?

A. Care is to be taken that the contraction made in this basin, or the displacement, leaves water area enough for the free discharge of the basin you place above.

Q. How large must that be?

A. That will be conditioned upon the outflow in the cross-section between East Boston and the navy yard or Charlestown bridge.

Q. You ought to have the cross-section here as large as the cross-section at the navy yard?

A. Neither. This cross-section must stand in proportion to the outflow of the artificial reservoir which you put above. Then, again, the distance at which you place this tidal reservoir, as stated yesterday, must not be too far up to meet the incoming tide.

Q. How far up would it be safe to place it? Would it be safe to go to Watertown?

A. You could not place a large portion in Watertown. A small portion might be placed in Watertown. There should be no deep water. It ought to be shallow water. The further you go, the shallower your reservoir must be.

Q. Do you know whether there is marsh enough on the borders of Charles River to answer the purpose?

A. It all depends on what your project is. If you fill up all that is suggested on this plan, I don't think you could find enough, because here is about three hundred acres. But if you are going to make only a small encroachment, I suppose you could. Of course, it all depends upon how much area you intend to take out. That is a question I cannot definitely answer, without you say whether you are going to take one, two or three hundred acres; but the principle you have got to go upon is this: If you transfer a tidal reservoir to a higher point, you can only use a portion of the column of water. If you want to make full compensation for the ten feet rise and fall of tide, you cannot go as far as Cambridge; and if you go as far as Cambridge, you cannot have marsh enough: and hence width of water will be an element, and you must prepare yourself to widen Charles River at Brookline bridge. You want five times the area at Watertown that you have below.

Q. If you are going to fill two hundred acres, ten feet deep at Cambridge bridge, you would want five times as much at Watertown?

A. Yes, sir. In proportion as you go away from this tidal reservoir, you can use less of this ten feet of column.

Q. (By Mr. BIRD.) You don't mean to say that we cannot find marsh there that would not require five square feet for one?

A. I suppose you can, in a portion of the distance. You can find marsh that would require three feet, four feet, five feet, or ten feet for one. In the whole of this discussion, I can only explain principles. I cannot say that in Cambridge it is enough, or in Watertown it is enough, because we have not even settled what deductions shall be made, and what shall be compensated for.

Q. (By Mr. BIRD.) I understand you to say, admitting all you claim as to the theory of preserving the water in the tidal basin, that if we secure the same volume of water and the same dimensions of the cross-sections, then we are all right?

A. There is another element,— the distance of the tidal reservoir from the harbor. The proportions of these three elements are to be preserved.

Q. All you want is a reservoir that will empty itself at every tide?

A. Yes, sir; that will not obstruct the incoming tide; and that we can obtain by taking out these three elements, — water way, distance, and height of tidal columns.

Q. Every ebb tide now, of course, meets the flood tide?

A. I beg your pardon, no, it does not. Our whole tidal system comes to a stand-still before the tide turns, with the exception of two or three places between the islands, where the tide comes from an opposite direction. That is, at low water, there is no current, with the exception of two or three localities in the upper harbor, where there is not width enough to discharge and equalize the basins, and there the tide runs in oppo-

site directions. When there is a flood tide, it runs ebb for a short time.

Q (By Mr. KINBALL.) What is the rise of the tide at the Arsenal?

A. I believe we have a record of it. I do not like to answer these questions from memory.

Q. Don't you know it is greater than it is at the Brookline bridge?

A. It is not from the cause of the running of the tide, it is from the back water.

Q. One of the plans was to fill eight millions of feet. If that filling takes place between the Mill-dam and Cambridge, to compensate for two hundred acres there, would it not be necessary to take on the river a space ranging from four hundred up to one thousand acres of marsh to be excavated, to replace it?

A. It would not be proper to answer the question, saying it would take four hundred or one thousand acres, without the conditions.

Q. What speed would you give the water as it comes down from the reservoir?

A. The upper reaches of that tidal reservoir ought to have very little velocity, or it will not have any effect. For the first two feet it will be mere falling water; and this falling away of that tidal column will set the water in motion, and that further falling away set the water in motion more, and by this operation continued, the lower channel gets scoured. And that is why we are obliged to have only a small column of water there.

Q. How soon are the effects of that water felt?

A. The mean velocity of this, divided by the distance, will tell the time it will take. I cannot tell you, without making a computation.

Q. If it was two feet at one point, supposing the whole compensation was made there, would you not be obliged to multiply that two by five?

A. If you put the whole of that compensation at a distance where you could only use two feet of tidal column, you would have to have five times as much.

Q. That would extend from two hundred acres at Cambridge bridge to one thousand at Watertown?

A. I am not prepared to assume Watertown as the maximum distance, although I believe it might be, from the fact that Watertown has a dam, which would prevent the water going beyond.

Q. (By Mr. BIRD.) I suppose you mean just this that the further you go from the present tidal basins, the more area you must have?

A. Yes, sir.

Q. Or rather, to go back of that, what you claim, and what these gentlemen who agree with you upon this theory of the harbor claim, is this: that in order to preserve the harbor *in statu quo*, you must have some kind of tidal reservoir just where it is now, and if you transfer it further up, you endanger the harbor?

A. Yes, sir.

Q. And, other things being equal, the further up you go, the more you endanger it?

A. Yes, sir.

Q. But you do not mean to say, that you can apply a mathematical formula here, and say, that if you go three, four or five miles, it will take three, four or five times as much? All you mean to say is, that the further you go up, the more area you require?

A. Yes, sir.

Q. You say everything should be kept *in statu quo*?

A. Yes, sir, because the present tidal reservoirs are merely enough to preserve the chanuel.

Mr. DERBY. I propose to read from McCulloch's Geographical Dictionary, which is a standard authority, in regard to all

geographical facts, an account of the harbor of Marseilles, France:

“The port to which Marseilles is wholly indebted for her early and long continued prosperity is a fine basin, stretching from west to east about one thousand yards into the very centre of the city. . . . Unluckily this fine basin becomes from its position the common sewer, as it were, or receptacle for all the filth of the city; and as it is not agitated by tides, which are here hardly perceptible, nor by storms, from which it is screened on all sides, nor swept by any current, the water is completely stagnant; and unless the mud were removed by dredging machines, it would in no very long time be entirely filled up. But in hot weather the stench arising from this torpid reservoir, and from the detestably filthy streets of the old town, is absolutely intolerable, at least to those not habituated to it; and has doubtless been the cause of Marseilles having suffered so dreadfully on various occasions from the plague, and more recently from the cholera. Such a state of things is a disgrace to a civilized country, and we agree with Mr. Maclaren in thinking, that, next to the enforcing of proper sanitary regulations in the old town, the best thing that could be done to improve the city would be to cut a canal from the *Anse de Joliette* on the west to the harbor, which would at once create a current, and freshen and agitate the water in the latter. In its present state, Marseilles has been truly described as a ‘vast cloaca.’ We doubt indeed whether there be a single water-closet in the city.”

I had occasion to visit the city of Marseilles in 1864, after the publication of this work, and I found that they had run out several breakwaters, and had made a succession of basins, three or four, and had been obliged to dredge the old reservoir, in order, not merely to obtain more room, but to improve the health of the city. They were also making a canal, to bring a large volume of water, to improve the harbor and promote the health of the city.

I will read now some facts in regard to the population of London. Dr. Price, in 1777, estimated the population at 543,420. His report was disputed, and there was a question whether it was not larger; but between 540,000 and 630,000 was the actual population of the city in 1777; very little more than the population of Boston and its environs at the present time.

I pass from the population of London with merely another remark, which is embodied here, that down to a very recent period, the deaths in London have exceeded the births, and the average length of life in the city was about twenty years. The average length of life has now been increased by better drainage and other improvements to between forty and fifty years. And it has been said, very recently, that in the city of Bristol, by improvements in drainage and other valuable sanitary improvements the length of life has been increased still further; so that a thousand lives annually have been saved by the intervention of one of her citizens, a Mr. Davis, who, by paying great attention to the drainage and reformation of the courts and alleys of the city, has diminished the number of deaths in the city of Bristol about a thousand a year.

I pass now, gentlemen, to the Thames river, which has been introduced here several times, and discussed :

“The Thames, averaging one thousand feet in width, is crossed by six bridges, built at an aggregate expense of more than £5,000,000.”

“The distance from London bridge to Lechlade, where the Thames becomes navigable, following the windings of the river, is $146\frac{1}{2}$ miles; the total rise from low water mark at the former to the latter being about two hundred and fifty-eight feet. This ascent is overcome by means of several locks, constructed at different periods, of which the first is at Teddington, $18\frac{3}{4}$ miles above London bridge; this consequently is the limit to which the tide flows. The low water surface of the river from Teddington

lock to London bridge falls about sixteen feet nine inches, or about $10\frac{3}{4}$ inches in a mile at an average. The high water mark at Teddington is about one foot six inches above the high water mark at the bridge; and the time of high water is about two hours later. The average fall in the bed of the river from Teddington to London bridge is about one foot a mile; the breadth of the river at London bridge is six hundred and ninety-two feet.

. . . But it is as a navigable and commercial river, having London on its banks and bearing on its bosom numberless ships fraught with the produce of every country and every climate, that the Thames is principally distinguished. Its depth of water is so great that as a shipping port London enjoys peculiar advantages; even at ebb tide there is from twelve to thirteen feet water in the fairway of the river above Greenwich, and the mean range at the extreme springs is about twenty-two feet. The river is in fact navigable as far as Deptford for ships of any burden; to Blackwall, for those of 1,400 tons; and to St. Katharine's docks adjoining the Tower, for vessels of eight hundred tons. As already stated it is navigable by barges to the confines of Gloucestershire."

Mr. KIMBALL. Where is the tidal basin of the Thames?

Mr. DERBY. It is far up the river. I do not know the area.

Mr. KIMBALL. Is there any but the several streams that run into the Thames?

Mr. DERBY. There are several streams that flow into the Thames.

I have a London journal every week, and I have followed the course of the changes there. The water of the river became so impure that the members of parliament said it was unendurable, and that they should be obliged to give up the new houses of parliament unless some change was made for the better, and the city of London has been subjected to an expense of twenty millions to make a large drain to purify the Thames River. This river, which, where it is contracted at the bridge is seven

hundred feet wide, and below the bridge, expands to a considerably greater width, averages about one thousand feet in width, has proved, notwithstanding the rapidity of the current, which is much greater than the rapidity of the current in our harbor, entirely insufficient for the drainage of London, and they have been obliged to relieve it by building a drain at an expense of twenty millions.

Mr. BIRD. By draining where?

Mr. DERBY. The drain is parallel to the river. By an embankment which is made on the side of the river, it is carried down a considerable distance towards the marshes, the ultimate intention being to distribute the sewerage over the marshes, and make market gardens for the city. But my theory is, that if the river had been two thousand feet wide, as this river is down to the commissioners' line, the twenty millions would have been saved.

Mr. BIRD. Where are the worst effects of the sewerage of the Thames manifested?

Mr. DERBY. Below the bridge. It is carried to a large cess-pool. There it is allowed to settle, and the surface water runs off into the river, a little below the city.

Mr. BIRD. But where are the worst effects seen?

Mr. DERBY. I should say not far from London bridge. There was an ancient river, which had been converted into a sewer, which brought into the Thames an immense amount of drainage matter, in the vicinity of the bridge.

Mr. BIRD. Is the worst part of the nuisance above the bridge or below?

Mr. DERBY. Between London bridge and Westminster bridge was probably the most offensive part.

Mr. BIRD. What is the width of the river there?

Mr. DERBY. The width at London bridge is seven hundred feet. I suppose the bridge was built at the narrowest part of the river.

Mr. BIRD. Do you know what the velocity of the river is there?

Mr. DERBY. I believe Mr. Pratt gave the rapidity.

Mr. PRATT. It is two miles an hour, at what is called "Trinity House," near London bridge, where all the observations are made.

Mr. DERBY. That would be, I suppose, one of the narrowest points of the river?

TESTIMONY OF NATHAN MATTHEWS, Esq.

Q. (By Mr. SHATTUCK.) You have been President of the Boston Water Power Company?

A. Yes, sir.

Q. What has the land been sold for between Beacon street and Columbus avenue, that is, about as far from State street as the land on this basin which it is proposed to fill?

A. The highest price has been ninety cents a foot, and the lowest has been sixty cents. That is, I take the land between Commonwealth avenue and Beacon street, and I think there is none this side of Columbus avenue. There were a few lots on Columbus avenue sold in the neighborhood of one dollar and one dollar and twenty-five cents. This side the cross-dam, we sold some lots for ninety cents a foot, and other lots for eighty cents. The first sale we made was at sixty cents; and a year ago we sold on Marlborough street, this side the cross-dam, some lots for sixty cents a foot, all filled.

Q. Do you know the average depth at which the land of the Water Power Company has been filled?

A. Taking an average of the flats, it has been from eleven feet up to fourteen feet grade. That is the height we filled the land.

Q. You have dealt in land in the neighborhood of Boston for a great many years, and sold and bought a great deal?

A. Yes, sir.

Q. Let me ask you whether, in your judgment, any considerable portion of this Charles River basin can be filled up at present, and sell for enough to pay the expense of filling, after deducting the streets, while such land as the Water Power Company and other parties have over on the Back Bay is still in the market?

A. I should not think it could. It would cost to fill up that land not less than fifty or sixty cents a foot, to fill it up as high as our land is filled up in the full basin and the empty basin, which we are willing to sell at from twenty-five to thirty cents a foot. Some of it is marsh, and some filled up to grade.

Q. This couldn't be made to pay?

A. I should not think it could.

Q. There is land enough in the empty basin and full basin to last a great many years, isn't there?

A. I should think there was, judging from the present demand. The first million feet of land that the Boston Water Power Company filled up they did not get the cost of filling. That was sold in August 1855. We all know what it brought. It did not bring the cost of filling into about \$150,000.

Q. Whereabouts was that?

A. Between Tremont street and Brookline street; the best land the company had, all round Warren avenue.

Q. How much have they made on their best land, beyond the cost of filling?

A. I should think the Water Power Company had made beyond the cost of filling from ten to twenty cents a foot.

Q. And it would cost more than ten to twenty cents a foot to fill this Charles River basin, in addition to what it cost the Water Power Company to fill up their flats?

A. Yes, sir, double that — three times that, probably.

Q. So that you would not take this land as a gift, and agree to fill it?

A. No, sir, not to agree to fill it.

Q. (By Mr. KIMBALL.) When, Mr. Matthews?

A. In the next ten years.

Q. (By Mr. SHATTUCK.) In the next twenty?

A. I can't say what I would do twenty years hence. I don't expect to be about at that time.

Q. (By Mr. BIRD.) You are not connected with the Water Power Company now?

A. No, sir.

Q. Can you tell how much land they own?

A. About eight million feet.

Q. Filled?

A. No, sir.

Q. Can you tell about what proportion is filled and what not?

A. I cannot say. Well, a good deal of it that was marsh land we consider filled, it is up to fourteen-feet grade. I should say that one-third of it was filled.

Q. In your judgment, would it injure the value of the Water Power Company's land if the commonwealth should fill these flats?

A. I think it would spoil the value of that property entirely. I don't think the Water Power Company would fill it up at all.

Q. (By Mr. KIMBALL.) You spoke of property that the Water Power Company would sell for from twenty-five to thirty cents a foot, in the full basin. I would ask if you would accept that?

A. Yes, sir. Most of that belongs to the West End Land Company, of which I am President.

Q. (By Mr. SHATTUCK.) How much do they own?

A. I think they own about the same, 8,000,000 feet. Then there is some land owned by other parties. There is about 25,000,000 feet of land there.

Q. (By Mr. KIMBALL.) Do you believe there could be any money made in filling that land?

A. I believe there could be money made in filling a portion of that.

Q. But not the whole of it?

A. Not the whole of it at once.

Q. Not to go right on and fill as fast as you could, and expect to get remunerated for it?

A. If you gave it to me, I could go right on and fill it up, because there is no sea-wall to be built. It would take a good many years to fill it up, naturally.

Q. You think it would be remunerative, if you could have it given to you, to go right on and fill it?

A. I do, sir.

Q. (By Mr. DERBY.) How high would you have to fill it?

A. That land would have to be filled, on an average, about seven feet.

Q. This land would be required to be filled in the neighborhood of twenty-one feet?

A. Yes, sir.

Q. (By Mr. KIMBALL.) What place would require an average filling of twenty-one feet?

A. Down on Charles River.

Q. You don't mean that the whole of this Charles River territory would require to be filled, on an average, twenty-one feet?

A. I am not prepared to state the depth. I only know that we sold the land on Brimmer street, and there is about fourteen feet of water there at dead low water, and there is some twenty-five feet, more or less, at high water; and I suppose that would have to be filled up nearly thirty feet there.

Q. (By Mr. DERBY.) It would require thirty feet of solid filling?

A. Yes, sir.

Q. And the average would be about twenty-one feet?

A. I should think it would be twenty-one feet. I have not gone into any figures, but judging from the land on Brimmer street, I should judge it to be that depth. I should think it would average twenty-one feet.

Q. (By Mr. KIMBALL.) For the whole area?

A. Yes, sir.

Q. You filled some land there at Brimmer street?

A. I did, sir.

Q. What does land sell for in that region?

A. They sell the land from one dollar and twenty-five cents to two dollars a foot, deducting out the streets. I bought it for a little less than a dollar a foot, all filled,—the sea-wall and everything all made.

Q. (By Mr. HILL.) Was not that filling mostly in the old channel? Did not the channel sweep round almost over the land there?

A. A portion. Most of it was filled up when I bought it.

Q. The original filling was in the old channel, or a part of it?

A. I think it was. I think the channel runs round under that wall. As the wall was all built when I bought the land, of course I had nothing to do with that.

Q. (By Mr. SHATTUCK.) That high price is owing to the fact that there are only a few lots with the water view, and owing to the water view?

A. Yes, sir.

Q. And there the land is not worth more than two dollars a foot?

A. I don't think it would sell for any more than two dollars. I sold a piece very recently for one dollar and twenty-five cents a foot, between Brimmer street and Charles River, on River street.

Q. That land in there, without the water view, is only worth from one dollar and twenty-five cents to two dollars a foot; that is the actual price?

A. Yes, sir.

Q. But one strip that has the water view is worth from five dollars to six dollars a foot?

A. I should think it was. The highest I sold any of it for was two dollars and fifty cents, — two dollars and seventy-five cents, possibly.

Q. (By Mr. BIRD.) Suppose that five, ten, twenty or fifty years hence somebody should be so foolish as to fill Charles River on the north side of Beacon street, a thousand feet, and make another street, parallel with Beacon street, and have an esplanade there, so that the front of the houses would look out on the river, what should you think land would sell there for?

A. I don't like to judge of a hundred years hence.

Q. Supposing it was done to day?

A. I should think it would bring, looking out over the water, not half enough to pay the damage that it would be to the land above.

Q. There might be a difference of opinion about that. What would it sell for?

A. I can't tell. I am not one of those prospective men. I only know what I have sold land there for.

Q. What is land worth on the north side of Beacon street?

A. I don't know, but nothing like that price.

Q. What is the land on the north side of Beacon street, with the back yards on Charles River, worth?

A. I can't tell, Mr. Whitwell is a better judge.

Q. (By Mr. KIMBALL.) You think that this street, laid out with the houses fronting the esplanade, would injure the property on Beacon street more than the value of these lots, don't you?

A. I think it would injure the value of the property south of the Mill-dam much more than the State could get for the land, even if they could have it all filled.

Q. And yet you don't know the value of those lots?

A. No, sir. You might buy them at twenty cents a foot; the damage would be greater.

Q. Then it would be a damage of twenty cents a foot and more for the State to avail itself of that property?

A. The damage would be more than five times as much as you would get for the property.

Q. What do you think could be got for the property?

A. I can't tell you. That is what I am not willing to express an opinion about. I am not an expert upon the prospective value of land.

Q. (By Mr. INGALLS.) What does land sell for on the south side of Beacon street?

A. The last sale we made was sixty cents a foot, on Marlborough street. In the neighborhood of the cross-dam, I should think it would be from that to one dollar and twenty-five cents.

Q. (By Mr. PLUMER.) What is the difference in the value of the estates on the north side of Beacon street and on the south side?

A. On the north side, I should think just about double.

Q. Do you know the distance from City Hall of this property that you say you sold for sixty cents a foot?

A. It is where Marlborough street intersects Parker street. Sixty thousand feet were sold a year ago last June, at auction, for sixty cents a foot; and a lot on the corner of Beacon and Parker streets sold for one dollar a foot — 27,000 feet.

Q. (By Mr. BIRD.) Do you remember who bought that lot that was sold at sixty cents a foot?

A. Mr. Daniel Davies, I think.

Q. (By Mr. DERBY.) How would the land on Mount Vernon and Beacon streets, and the new land of the city of Boston, be affected by filling up this area and putting houses upon it?

A. I cannot tell.

Q. Have you noticed anything about the effect of shutting out water upon piles?

A. I have noticed the house of Mr. Brooks.

Q. (By Mr. BIRD.) Is not this the fact, that for forty years, (I do not mean to say that there may not have been temporary oscillations of price,) while the available area of Boston for putting up houses has been constantly increasing, the price of real estate has been also increasing, with the slight exception of the North End, which the city is going to remedy by cutting good streets through there?

A. Real estate in the old part of the city has been increasing, except the North End, perhaps.

Q. All parts?

A. You can hardly say that that land has been increased in value which has been made within a few years.

Q. That has been a matter of speculation very much; but have you any doubt that there is going to be a steady rise in the value of all this property on the Back Bay in future?

A. I think the value of the land on the Back Bay depends entirely upon the facilities of keeping open this water space. If you close that, it will reduce the value of property on the Back Bay; people will go to Longwood and other places and settle rather than settle there. I think it will be of much less value ten years hence, if any portion of that is filled up.

Q. (By Mr. KIMBALL.) Did the filling of the Back Bay militate against the Water Power Company's lands?

A. The Water Power Company and the State were sort of partners. They divided the land. One took half, and the other took half.

Q. Exactly; but has the shutting out of the water area injured the value of the Water Power Company's land that they have made?

A. I can't tell anything about that, it is so far back. I was not in the Water Power Company at that time.

Q. You have been in it since about the time of filling the lands, haven't you?

A. Yes, sir.

Q. Now, then, has the filling of the Back Bay territory by the Commonwealth, and the shutting out of the water area, injured the value of the Water Power Company's lands?

A. I cannot say. There has been no water in the empty basin since 1821.

Q. The Commonwealth, every day they are filling, are shutting out water, are they not?

A. No, sir.

Q. (By Mr. GRIGGS.) I was requested to ask you in regard to the effect of filling up on the piles. I believe you said you thought it would cause the tops of the piles to rot if there was a filling in on the north side of the Mill-dam.

A. No, sir, I did not put it in that way exactly. I don't know that I can go over the same ground again. I said the filling of so large a space as from Beacon street up to Charles River, and from Charles River up the other way, would probably keep the moisture of the sea water away from the piles already driven to a certain extent, and if it left them dry, they would be liable to rot.

Q. You applied that remark more particularly to building lots on the Back Bay?

A. To what is already occupied by buildings, both on the north side and south side.

Q. Does not the Mill-dam operate as a dike, which keeps the water from the river or sea from going through and keeping those piles moist?

A. The water is admitted by the large sewer inside of the Mill-dam now, and that spreads both ways from the Mill-dam. When they complete the filling, the part which is not near the sewer will be subject to the operation I speak of.

Q. (By Mr. DERBY.) Have not the piles decayed under the Boston and Maine Railroad station?

A. I have seen decayed piles there, and I have seen piles lifted there. The same thing took place at the Boston and Worcester station, on Kingston street.

Q. (By Mr. KIMBALL.) You would not think of maintaining water on these flats for the purpose of keeping the tops of piles sound that were not driven as low as they ought to have been?

A. As a preliminary security, I should cut off the piles low enough to place them beyond the possibility of injury.

Adjourned.

FRIDAY, November 26, 1869.

The committee met at 10½ o'clock, the Hon. F. W. BIRD in the chair and the presentation of testimony was proceeded with.

TESTIMONY OF Colonel NEWELL A. THOMPSON.

Q. (By Mr. INGALLS.) Colonel Thompson, you are somewhat familiar with the prices of real estate in the city of Boston and upon the Back Bay of Boston, are you not?

A. I am, sir.

Q. I think you have been the auctioneer employed to sell the commonwealth lands, have you not?

A. Yes, sir.

Q. With your experience, sir, wont you be kind enough to give your opinion to the committee as to what effect it would have upon the property on the north side of Beacon street if the commonwealth should fill up the flats out for a distance of 1,400 or 1,500 feet, leaving a channel of from three hundred to five hundred feet; what the injury in your opinion would be to the property on the north side of Beacon street; what percentage, I mean?

A. Well, sir, that is a pretty difficult matter. I have seen in the papers this discussion, or rather this hearing; but I have never until this morning looked at what the committee proposed to do in relation to Charles River. I certainly should not have come here voluntarily to make any statement, but I was requested to by counsel; I will say what I believe

every citizen of Boston will say, who understands the matter, and I desire as one individual to express my views against any such appropriation of tide water. I believe, sir, that if the commonwealth of Massachusetts desire to enter into a land speculation, they may take the money it would cost them to fill up the flats, as proposed in Charles River, and expend it in purchases upon the side of Boston where nature intended that Boston should extend, and make more money in the long run by keeping a debit and credit account, and charging what it might cost, and crediting what they might sell in fifty years. I think they would make more money in that way than they would if they should fill up as a speculation, the flats in Charles River. I think that the value of commonwealth lands which they own now, and the lands which they have sold heretofore to the citizens, and the inducement that it was a location where the citizens would be warranted in erecting a class of high cost houses, — I think that it would be more injurious to the remainder of the commonwealth lands on that side of the dam, and to the people who built their houses on both sides, than all the money that the commonwealth could possibly get out of any speculation of that sort. It seems to me that nature has arranged where our city shall extend, and how much it shall be extended; and there is ample space enough, and the commonwealth have aided it themselves between the dam and the mainland in this direction, and have aided it between the city of Boston and the mainland in this direction, and I cannot now see what more land Boston will need as a city if it continues for five thousand years. And it seems to me that where there is a natural outlet for drainage purposes, and for the purpose of bringing in fuel, coal, and wood, etc., etc., it is hardly the course of wisdom to undertake to spend a large amount of money in filling these flats up, and driving piles for a foundation, when there is so much room on this side of the city for improvement. And I say again, that the commonwealth, if it should buy the

land on the south side of the Mill-dam, as far out as it could buy, as far out as Parker's Hill, for instance, and fill it up for house-lots, would make more money in the long run than it can possibly make by the course which is undertaken to be pursued in regard to this matter. I have merely run over hastily the testimony which has been given here by persons who are more familiar with the subject in a sanitary point of view; but it seems to me to be self-evident, as a sanitary precaution, that it is highly important that this space should be kept open.

Q. What I want to get at is, what in your judgment is the percentage to which it would injure the property on the north side of Beacon street?

A. Well, I should say that if you filled up the space that it is proposed to fill up there between the present commissioners' line and the proposed line outside the flats, it would gradually diminish the value of real estate upon that side of the dam at least fifty per cent — at *least* fifty per cent. It would diminish the value of all the property upon the other side a large percentage. Because I think that as the city extends, gentlemen who can build houses of the class of those that are now being erected there, in the faith that they are having their houses in an open neighborhood, would go further into the new city as extended, and would not erect the class of houses there such as have been erected here.

Q. You mean it would injure the whole Back Bay?

A. I mean it would injure the whole Back Bay by everything that you put there.

Q. (By Mr. PUTNAM.) By the new city as extended, you mean the land on this side of the Mill-dam, and not the land on the other side of the channel?

A. Yes, sir.

Q. (By Mr. INGALLS.) What would be the percentage of injury, in your judgment, on the property on the south side of Beacon street, and on Commonwealth avenue?

A. I say that the filling up of that territory would naturally diminish the value of all the property on both sides; not only that which the commonwealth has sold, but that which the commonwealth has now to sell; because it would be filling up one of the great sources of gratification, air, pleasure, etc., that everybody there has depended upon. Everybody that has built a house there has built it with the idea that he is near an open space of water, and that it is to be open permanently. I have built a house that has cost me some little money, which is on the other side of the Public Garden; and I am sure I should consider that it would depreciate the valuation of my property, because it deprives me of the air that I get every pleasant morning.

Q. (By Mr. DERBY.) You gave the percentage of the depreciation of value on the north side. What percentage of depreciation should you say there would be on the south side?

A. I could not tell that, sir. I feel sure that, in case the water view on that side of the Mill-dam was closed up, as proposed here, it would eventually injure permanently the value of the structures that have been erected on that side of the dam, and on Brimmer street, and along there, at least fifty per cent. I would not give so much by fifty per cent for a house standing half a mile away from the new line with a muddy flat standing across the space, a flat which would probably not be built up for the next fifty years. I do not think anybody would think of buying it at anything like the price of these houses.

Q. (By the CHAIRMAN.) What has been generally and uniformly the result of the filling up of the flats about Boston in the last fifty years? Has it been to increase or to depreciate the value?

A. I am not so familiar with this subject as some others, but I suppose it would depend entirely upon the location, or for what purposes it was desired.

Q. What has uniformly been the effect in your judgment of

the filling of the flats about Boston? You are aware that Boston has been raised out of the water to a very great extent, having now an area of some 2,000 acres, 1,300 acres of which have been raised out of the water.

A. Undoubtedly beneficial, so far as my knowledge extends.

Q. Why should not the same results follow here?

A. I should say, sir, that if the commonwealth undertook to go into a speculation by filling up the flats near Breed's Island, it might not be beneficial; but I say, so far as my experience goes, that the filling of land where it is needed for buildings and has been needed for buildings, and warehouses, has been beneficial thus far.

Q. But you assume that in this case the committee intend to recommend filling up before it is needed?

A. My opinion has been expressed fully; as fully as I could give it, as to the result of undertaking to fill up that side.

Q. I only wanted to know why the filling here would diminish the value whenever there comes a demand for this property. The flats never could be sold until there is a demand for them, of course. Now, I should like to ask you whether filling the Back Bay will tend, in your judgment, to injure the value of the property already filled?

A. I do not understand your question.

Q. The further filling in, west of the Back Bay, of the flats by the Boston Water Power Company, or the West Boston Land Company, would, on your theory, tend to injure the value of the property already filled?

A. I am not saying that I believe filling up these marshes would so injure property as to fill up a basin of water that is changed once in twenty-four hours.

Q. Very well; the conditions may be different in that respect, but so far as respects bringing the new land into the market, wouldn't the effect be the same in both cases?

A. What do you mean, Mr. Bird?

Q. The additional filling of the Back Bay would tend to injure the land already made?

A. The additional filling of the Back Bay on the south side?

Q. Yes, sir.

A. I did not say that. I say the commonwealth have materially benefited the city of Boston by filling up a portion that it seems to me nature intended for the extension of this city. But that is much less expensive to fill, and would be more desirable for residences than it would be to build upon a bed of mud, upon the other side.

Q. There is no more mud here than there was upon the Back Bay, is there? Now, you have spoken of the plan of the committee. The committee have no plan. That has been stated repeatedly. The question upon which issue is taken here is, what will be the effect of *any* filling north of Beacon street? We have not fixed any line, either three hundred or four hundred feet. That is a question for the future. But suppose that we should fill up three hundred or five hundred feet, and excavate the flats bare at low water, and retain just as large an area over which the wind is to blow, what then would be the effect of this filling?

A. I should think any filling outside of the present commissioners' line would affect immediately those inside of it on that side of the dam.

Q. Would affect the sanitary condition?

A. That is a mere opinion; that any diminution of the area of Charles River outside of the present commissioners' line would have a tendency to cheapen the land on both sides.

Q. By cutting off the prospect?

A. Yes, sir; by cutting off the prospect, and by cutting off the natural area for the air.

Q. But suppose we leave as large or a larger area covered with water than there is now, wouldn't that objection be removed?

A. That would have a tendency, as far as the general effect of the water is concerned; but it would immediately affect the owners of real estate in the immediate vicinity.

Q. (By Mr. KIMBALL.) When you built, you had an unobstructed view across the flats, did you?

A. My house, I believe, was one of the first erected. I built my house on the faith of the city that there was to be an opening in front of me; and if it turns out so, of course my house is worth as much as when I built it, although at the time it cost me more money than I should have laid out except upon such a consideration. And I suppose a good many others have built very much more expensive houses in that locality than they would have done if the Public Garden had been cut up into streets, according to Mr. Quincy's plan.

Q. I understand that you bought with the understanding that the faith of the city was pledged that it was to be kept open?

A. I did. I was auctioneer at the time, and I stated it by the direction of the committee at the time; and I have said this over and over again, that I sold this land on that side of Boylston street by public auction with the understanding that this space was to be kept open. Mr. Ferdinand E. White and myself were the auctioneers; and I was closeted with the committee having charge of that matter for an hour or two before that sale took place; and I was expressly authorized and directed to use an argument in the sale of the land that there was to be the Public Garden to be forever kept open; and that is a point that Mr. Webster, if he had ever been brought to argue it, would have maintained; but that is a fact within my immediate recollection; and I have always heard it so stated; and I was authorized to declare at that sale that that was to be forever kept open.

Q. And on the commonwealth lands, when you built there, you had from your house an unobstructed view of the Back Bay? There were no buildings between?

A. I did at that time.

Q. Now, I want to ask you whether the filling up of the Back Bay, and the building of houses there, these costly houses, and shutting out entirely your view across the country west, and across the water, — whether that has not injuriously affected the value of property?

A. I don't know that it has injuriously affected the value of property; I should have very much rather have had it kept open.

Q. Whether or not the property has not been gradually advanced by the building of these costly houses? Whether all the land in your vicinity has not largely increased in value since the building of these houses?

A. I dare say that is so, sir.

Q. And of course that has been the means of occupying other costly houses?

A. I should very much have preferred to have had a natural river, which is filled twice every day, than a mud hole.

Q. The question is not what the flats of the Charles River are going to be in fifty years hence. The whole question was, whether the buildings so far erected had injured the property where you reside.

A. I do not think filling above there would be. I think filling in the whole territory extending in that direction, on that side of the dam, would be beneficial all around. I think what makes it beneficial is the fact that it has a fresh breeze from the north and northwest over the Charles River.

Q. (By the CHAIRMAN.) For what purposes is land most valuable, for dwelling-houses or for business purposes, warehouses, etc.? Where does land bring the most, where it is to be occupied by dwelling-houses, or for stores and warehouses?

A. Where it is to be occupied by stores and warehouses, of course.

Q. How long is it, in your judgment, before Beacon street is to be occupied by warehouses, etc., like Colonnade row?

A. I do not know; I have not thought of that particularly.

Q. You have seen where business has encroached upon private houses in other localities.

A. I dare say that all the streets around the Common will sooner or later be occupied, like the streets around the Park in New York.

Q. I simply wanted your views upon the question, whether the filling of the Charles River would injure the value of property for these purposes. No matter; that is a thing of the future.

Q. (By Mr. CHILD.) Col. Thompson, do you think that in case a committee of the legislature should recommend that the commonwealth fill these flats at some future time, and that policy were adopted, it would have the same effect upon the price of land as if it were immediately begun?

A. It might have different effects upon different minds as to what would eventually be done. It would probably be so remote, and in fact I think it would be a long time before the legislature of Massachusetts would consent to have any such policy carried out; so that it would have very little effect upon the present value, or for a few years to come. It is something which, however, this committee may report, will probably agitate public opinion more than it has.

Q. (By the CHAIRMAN.) You have been in Boston in active business something like forty years?

A. Some forty years.

Q. You have seen very extensive filling up of flats about Boston in the South Cove, in the Back Bay, on Front street, and all that territory. Have you ever known an instance where the filling has not been an immense improvement, and increased the value of the adjacent property?

A. I don't think that the filling of South Cove ever did any very great good.

Q. Haven't these fillings been opposed from beginning to end; and yet have they not been great improvements?

A. I am not entirely familiar with all of them, but I have no doubt of it at all.

Q. (By Mr. INGALLS.) I understand your testimony to be, that, in your judgment, between South Boston and the Mill-dam there is sufficient opportunity for the accommodation of the city in the filling of flats for the city to go in that direction, and that any filling on this side of the dam would be an injury.

A. I have so expressed my judgment.

Q. (By Mr. DERBY.) Col. Thompson, you were speaking in answer to the chairman, in regard to the filling up of these flats about the Mill Pond having been an advantage in some instances. I would ask you, sir, whether any of these flats were at the time annoying and a nuisance to the neighborhood.

A. Yes, sir. I do not remember much about the Mill Pond, because that was nearly completed before I came to Boston; but I know in regard to the South Cove, and I know that it would be so probably in regard to the flats out here, and in the harbor, — filling up in the harbor — there would not be these high cost buildings that would go there. There was a time within my recollection, since I have been an auctioneer, when the houses on South Cove could not be sold for the cost of erection, — the houses themselves, without regard to the land. If I remember right there was some little difference of opinion as to how that Cove should be laid out; whether it should be wide streets or narrow streets; and the streets were not going to be wide enough for the erection of a high cost class of houses.

Q. You spoke of the difference in value for houses and for stores. Is it not the case in Beacon street that the land is nearly or quite as valuable for houses as it would be for stores?

A. As it would be for stores in some places, undoubtedly; because there are some parts of Boston where the land would bring a great deal higher price for houses than for mercantile purposes. That is probably the case with Beacon street.

Q. That would apply to all of Mt. Vernon street, and the slope to the northwest.

A. I should say so, for the present.

Q. Taking your experience in the past as a guide for the future, this land for a quarter of a century to come will be likely to be used for private houses rather than for stores?

A. Well, sir, that is my opinion. I think that there are no immediate necessities, nor any anticipated necessities, that buildings in this part of the town will be required for business purposes, except merely in the case of some of the corners for provision stores and corner shops.

Q. Isn't it the case that a greater part of the filled lands have been used rather for commercial purposes, and shops and stores and manufacturing establishments than for dwellings?

A. Yes, sir; so far as my knowledge extends.

Q. (By Mr. KIMBALL.) You would estimate the value of buildings on Colonnade row as much more for the purposes of stores than for dwellings?

A. It is because — not because they want it, because there are vacant stores there; they are obliged to ask so high a price for the rent that a great many of them are vacant, or a great many have been to my knowledge. It is a little in advance of the time. People have gone a little ahead of time; but in my judgment all the store property on Tremont street is not wanted.

Q. But still it is more valuable for stores than for dwelling-houses?

A. Yes, sir; because —

Q. I want simply this question; whether in your opinion the property on Colonnade row, between Boylston street and Court street, is more valuable for stores than for dwellings?

A. Well, sir, my opinion is, that if you kept the stores out that are not really in demand, the houses would have been more valuable for dwelling-houses than for stores. There is no doubt that people for purposes of speculation have gone and intro-

duced stores there in advance of the demand. It will come by and by, because they have got the entering wedge there. But at the present time, if all these buildings on Colonnade row were residences as they are on Beacon street, they would be in good price, and be in good demand, comparatively, as they are on this side. But it is the bringing in business, the entering wedge, that drives people away. The probability is, that they will rent them for more for stores than they will for dwelling-houses.

Q. I want your opinion as an expert, whether the property on Colonnade row, between St. Paul's Church and Court street, is not more valuable for stores than for dwelling-houses?

A. It is now.

Q. Whether within your memory it has not been more valuable for dwelling-houses than for stores, — nearly the whole distance?

A. I should think so.

Q. (By Mr. DERBY.) Is it as well adapted for business purposes on Beacon and Mount Vernon streets as on level streets?

A. No, sir.

The counsel here gave way to Mayor Saunders, who, in behalf of the city of Cambridge, addressed the committee at some length in opposition to the proposal at issue.

TESTIMONY OF ROBERT E. APTHORP, Esq.

Q. (By Mr. PUTNAM.) What is your occupation?

A. Real estate broker.

Q. How long have you been a real estate broker in the city of Boston?

A. Nine years.

Q. Have you had occasion to be familiar with the real estate operations west of Beacon and Charles streets, and in that neighborhood?

A. Yes, sir.

Q. Are you familiar with the value of property in that part of the town?

A. Yes, sir, tolerably so.

Q. [Showing plan.] This is the plan, Mr. Apthorp, which the committee have given us to work from. The line on the west is the harbor commissioners' line on the Cambridge side; there is a line parallel to it on the Boston side, five hundred feet from it. These two lines enclose the proposed channel. Here is the present harbor commissioners' line on the Beacon street side, and this is the space which upon this plan would be filled up. Now, I will ask you, Mr. Apthorp, if examining that plan, and supposing that plan to be carried out, and any considerable portion of this space to be filled up between the present harbor commissioners' line on the Boston side, and have the present line towards the Cambridge shore, what would be the effect upon the value of existing real estate — in the first place, immediately bordering upon the water, Beacon and Brimmer streets, and Charles street?

A. It would be very difficult to fix a percentage of diminution; I suppose, under the excitement of the change, it would make people sell it at a low rate. What it would settle down to, as a matter of positive value or relative value, I do not know; it would be very large at any rate, I think.

Q. Will you state whether the property in that neighborhood has been improved with a view to the present condition of things?

A. Yes, sir; I believe that is pretty well known.

Q. Whether a class of houses has been built there which would not have been built there excepting upon the idea that this area was to remain open?

A. No doubt about that, sir.

Q. You say you cannot fix with precision the value, or in what percentage it would depreciate; I would like your best judgment.

A. I have very vague ideas about it; I should say from twenty-five to fifty per cent.

Q. Leaving the land abutting upon the present harbor lines, and coming farther inland, what would be the effect upon the value of land in the neighborhood not immediately abutting on the harbor line?

A. It would be relatively less.

Q. What would it be; favorable or unfavorable?

A. Unfavorable. It would affect all the land down to the harbor line. I think all the western slope of Boston would be affected.

Q. But I understand you to say it would be less injurious as you come farther inland?

A. Yes, sir; according to the remoteness of the water.

Q. Mr. Apthorp, did you ever have occasion, sir, when Brimmer street was first laid out, to make any inquiries with regard to the land that was then proposed to be built upon?

A. I did.

Q. Will you state what your experience was, and what you found in relation to it?

A. When that section between the commissioners' line and Charles street was laid out, I desired to build there, anticipating moving in from Cambridge, thinking it the healthiest part of the city, and inquired the price of land there of Mr. Braman and others who had land for sale, and had made up my mind to purchase a lot of Mr. Higginson. Some gentlemen at that time said that there was some uncertainty in regard to the commissioners' line, and I thereupon consulted some parties, and among others I went to Governor Andrew, knowing that he owned a lot there, and I asked him his advice. He said, "I should not hesitate at all. I consider that the faith of the State is indirectly pledged to keep this open area, and I feel so little risk that I have purchased myself, and have advised Dr. Holmes and others

as I advise you. But were there no other reasons, I think that the people of Boston and the people of the Commonwealth can so easily become satisfied of the propriety of keeping that water area open for sanitary purposes alone, that were there no other argument, I should feel no hesitation." That is, in short, the substance of a long interview that I had with Mr. Andrew. And the result was, that I made an offer for the property, but it was refused. I have since purchased on Brimmer street, and built a valuable house there.

Q. (By the CHAIRMAN.) When was this conversation with Governor Andrew?

A. I do not think I can fix the time without some reference.

Q. Was Brimmer street filled?

A. Brimmer street was filled.

Q. How long had it been filled?

A. I cannot fix a time. Mr. Davies is present. It was just the time —

Q. At any rate Charles River was filled up to Brimmer street? Did it ever occur to you that the faith of the commonwealth was pledged not to fill up beyond Charles street?

A. Not directly; oh, no.

Q. Then you do not know that the faith of the commonwealth was pledged before the filling up of Brimmer street?

A. No, sir.

Q. What in your judgment would be the effect of building on the north side of the property on Beacon street upon the value of the property on the south side? You are aware, of course, that there is a strip of territory in some way or other procured from the commonwealth, that somebody got possession of a strip of land on the north side of Beacon street, and filled into Charles River there, two or three hundred feet; and I do not remember that at that time there was any cry of ruin to the property on the south side.

Mr. PUTNAM. There was no property there.

Q. Why should the building of houses on the north of property on the south side of Beacon street by the building of those houses on the north side of Beacon street, cutting off what was then a front view of this beautiful water, and what is now the back view to those people who live there now?

A. Possibly it might have been twenty-five per cent as the range of difference between the two sides now.

Q. Twenty-five per cent?

A. I should think about that, in the rough.

Q. Why should the building of houses on the north side of property on Beacon street injure it to the extent of fifty per cent? You said from twenty-five to fifty per cent. Would not the injury be as great to the houses on the south side by the building of houses on the north of Beacon street as it would be to fill up the flats and build houses on the north side of the houses already built?

A. Yes, sir; I think fully as much so, and I can give you the reason.

Q. (By Mr. PUTNAM.) Give your reasons if you please?

A. I was going to state, that the persons who were owners of the water front, whether justly or not, consider it a great advantage in respect to money value.

Q. (By the CHAIRMAN.) Those just back of it?

A. Those who come nearest to the water; and they have found out by experience that it is an element of great money value. Perhaps more has been thought of it within the last twenty years; at all events, it has enhanced the value of that property to a very great degree.

Q. We understand that. But was it not true that the people on the south side of Beacon street had the same right to complain of the obstruction of their view as the people on the north side of Beacon street? If the Mill-dam never had been built, would not these people have got the same view in front as the people on the north side of Beacon street now get on the back side of their houses?

A. But the houses were not built.

Q. (By Mr. PUTNAM.) Was there ever any land on the south side of Beacon street sold until after the line had been fixed and buildings had been commenced, and it was understood that they were to be built?

A. I speak from my memory as a boy; I think not.

Q. Now, Mr. Apthorp, was not every building that has ever been built on the south side built on the theory that the north side was to be built up?

A. I presume so.

Q. Then building on the north side of Beacon street did not depreciate the property toward the north side of Beacon street at all, that property having been filled and then improved with the understanding that the north side of Beacon street was to be filled up and built upon?

A. I think not.

Q. (By Mr. CROSBY.) Mr. Apthorp, will you be kind enough to answer this question, if you have an opinion; how much it would increase the value of property on the south side of Beacon street if there were no buildings, and it were understood that there were to be no buildings on the north side, and the water came up to the front?

A. Of course that would be an immense increase, because they would front on the water.

Q. Then your opinion in regard to the depreciation of the value of the present property, if a part of this area should be filled, is upon the assumption that that filling is to be immediate, is to be done at once?

A. No, sir. I think I can give my opinion in regard to that pretty accurately, by telling you that I own a house there, and I should sell it at a very great depreciation if I had any apprehension that this would ever be filled up.

Q. Suppose it was marked out as the policy of the commonwealth, that this land, as soon as it was wanted for purposes of

trade or for residences, was to be filled in; suppose that was the settled policy of the commonwealth?

A. I would sell at two-thirds the cost of the house.

Q. Without waiting to know whether it was to be wanted next year, or not for ten or twenty years?

A. Yes, sir.

Q. Then I assume you believe that land is soon to be wanted?

A. No, sir, I don't apprehend it at all.

Q. What reason should there be for selling out your property for two-thirds of its value, if you thought there was no chance of its being used, it being the policy of the commonwealth that these flats should be filled in whenever required for dwellings or for trade?

A. I think that would settle the value of it. If I can guarantee my estate against any encroachment, against the erection of any houses intercepting my view of the water, it gives me a certain value that I feel I can bequeath to my children; if not, I will take the two-thirds and go somewhere else.

Q. Without waiting to know whether it would be wanted or not?

A. Yes, sir.

Q. Have you any feeling as to the probability of its being wanted for business purposes, or any other purposes within the next thirty years; as to the probability that these lands will become so valuable, abutting upon that water area, that it will pay as a speculation to fill them up for furnishing solid land as was done upon Washington street and Suffolk avenue?

A. I don't believe it will be done.

Q. Whether you think it would pay to do it?

A. Pay in a money way merely?

Q. Yes, sir.

A. I have not thought sufficiently of that to give an answer. I think the remoteness of the other side of the city, except over

the hills, would be such an interference with cartage and drayage that I can hardly suppose it in its present form to be a likely thing.

Q. Is there any hill intervening between deep water here [indicating on map] and across there; any hill that would interfere with the transaction of business?

A. No, but it is a very long distance round.

Q. Are you a Boston boy?

A. Yes, sir.

Q. Do you remember when we could stand on Washington street and throw a stone into tide water on each side?

A. I can conceive of that being so, but I have no recollection about it.

Q. Do you remember the excitement about the proposition to fill a part of those flats and the damage it would do to the city?

A. No, sir.

Q. I remember such a discussion, and that gentlemen interested in the property in that neighborhood were very much excited about it. I wanted to ask, in connection with this, whether you think, on the whole, it has been for pecuniary reasons and all reasons advantageous that that area up there where I used to go shooting peeps, and used to go skating and swimming, that all that has been filled up?

A. South Cove, you mean?

Q. Where all these new streets are, stretching down towards Commonwealth avenue, east and west of the neck?

A. I think that has been advantageous; that is my present opinion.

Q. Advantageous, even although in doing it the feelings of persons then owning property abutting on that tide water were very much lacerated, and although some of them may have sold out their property at a loss and gone away?

A. I don't think the feelings of people on that subject ought to be considered at all; it was a public matter.

Q. (By Mr. BIRD.) In regard to all these fillings which you have seen constantly taking place, has not it been the uniform rule and result in all cases that, although they were opposed at the start by the abutters and owners of the adjacent property, on the ground that their property would be ruined, the property of the different owners has been very much improved in value?

A. I suppose it to be so, but I think this is to be under different circumstances from the others.

Q. You don't look forward to the possibility of there being a large business demanding that land on this side of the city above the bridges?

A. Not to that degree as to make the commonwealth insane enough to stop up that river.

Q. That is not the proposition of the commonwealth, or anybody else; but to diminish the present area upon the supposition that the diminution of the present area may at the same time furnish equal, if not greater, facilities for water transportation than is now furnished; facilities for larger vessels, moved at greater speed.

A. I cannot be made to feel that any benefit is to be derived from any artificial channel substituting the present wide water area, with the flats nearly uncovered, or partially uncovered, at low tide saturated with salt, and emitting no effluvia, so far as I have observed, during a great many years that I have lived in Cambridge and Boston. I cannot conceive how any substitution of the present water area which narrows it can be beneficial. My mind is open to conviction, but although I have listened with attention to what has been said upon the subject (and there has been a good deal of plausibility to some of the considerations), I have not been convinced at all.

Q. I have no reference to the sanitary aspect of the question at all; whether, in a business point of view, there might not

come such a demand for that area that it would have to be taken?

A. I should want to sit down and study the plan of Boston maturely before I could give an intelligent opinion on that subject. I have no opinion on that subject.

Q. What is your opinion in reference to Mount Vernon street being occupied for dwellings or stores in the future?

A. I think, as Colonel Thompson answered the question, that where there is a high hill, stores would not be built on account of the difficulty of cartage; the coal dealers have to supply two extra horses for each load of coal that comes up that hill now.

Q. (By Mr. KIMBALL.) Do you remember Fort Hill?

A. Yes, sir.

Q. (By Mr. PUTNAM.) That had to be dug down to a level, although within a stone's throw of deep water, before it could be used for business purposes?

A. Yes, sir.

Q. (By Mr. DERBY.) Have not the fillings been usually of flats which had become nuisances, like the South Cove and Mill Pond, and not on bold water?

A. I said that was a distinction.

Q. Take the filling at the South End, the fillings there of marsh along each side of the neck, where the tide sometimes flowed across the neck, were very slight fillings, were they not?

A. I regret that I did not succeed last year in making a contract with Mr. Bird for a house at the foot of Chestnut street. I think if he had lived there twenty-four hours, he would have been reminded that Boston lies to northeast and east of Charles River, and that the prevailing winds of this climate are southwest, west, and northwest, all of which bring the health-giving breezes from the country across the water, and cool that whole side of the hill.

Mr. BIRD. God forbid that Mr. Bird should, because he

lived on land which had been filled for his benefit, stand, like a dog in a manger, to prevent any land being filled in front of him.

WITNESS. But he could not have lived there without feeling that the whole city was enjoying the benefit of that open area.

Q. (By Mr. DERBY.) Whether the tendency of the winds in summer time is not from the southwest across this basin into the city?

A. Yes, sir, and if I could have got a benevolent screw on Mr. Bird, I should have had him.

TESTIMONY OF THOMAS HILLS, Esq.

Q. (By Mr. PUTNAM.) You are one of the principal assessors of the city of Boston?

A. Yes, sir.

Q. Chairman of the Board, are you not?

A. Yes, sir.

Q. How long have you been chairman of the assessors?

A. Two years, I think, I have held that position.

Q. How long have you been one of the principal assessors of the city?

A. Since the first of May, 1865.

Q. Had you served as assessor before that time?

A. No, sir.

Q. Have you had occasion to become familiar with the value of real estate in all parts of the city, or only in particular localities?

A. A general knowledge of all parts, and a somewhat detailed knowledge of certain sections which I have personally assisted in assessing.

Q. Mention the particular sections that you have had

occasion to have special knowledge of, from personally assisting in assessing yourself?

A. Ward 6, which is the Beacon Hill district; Ward 9, which is the district of the new land and vicinity of Tremont street, and Ward 12. For a part of the time, I had charge in the office of the books, and was somewhat intimately acquainted with the valuation of Ward 3, which is the district in the vicinity of the Massachusetts General Hospital.

Q. You have heard, perhaps, what the plan of the proposed filling is?

A. Simply what I have heard since I sat here this morning, and what I have read in the papers.

Q. Assuming that it is proposed to fill up a considerable portion of what is now Charles River basin, extending, say a thousand feet more or less from Beacon street and Brimmer street into the basin of the river, I would ask you what would be the effect of carrying out such a project as that upon the value of the real estate now abutting upon the river, having a view to the present character of the improvement of that real estate?

A. It would, in my opinion, diminish its value materially.

Q. How materially, sir?

A. I should say upon vacant land, unoccupied by dwellings, my opinion would be measured by saying it would diminish it from twenty to twenty-five per cent; upon land occupied by dwellings, it would diminish the cost of estates that would range now in the vicinity of \$25,000 or \$30,000, twenty-five to thirty per cent, and a very much larger per cent as you touched estates that were more costly, on account of the character of the edifices.

Q. That is, a class of edifices has been put up there which are very much more expensive than would be appropriate in such a locality, if the water which is now on the north and west side were filled up and made land of.

A. I think a class of edifices have been erected there, of superior character, on account of the supposed advantages of the location; and those advantages being taken away, the people who occupy them would remove, and the people who purchased them would only purchase them at a reduced value.

Q. Erected where?

A. On the new land; mainly upon Beacon street. It would be felt more there than it would be upon Marlborough street, more there than upon Commonwealth avenue, and so the scale would be reduced as you went southward.

Q. To what extent other real estate, not directly abutting upon the river, or near to the river, would sympathize with the depreciation of the property immediately on the river; how far would the depreciation extend?

A. It is mere opinion, but I should think it would extend full as far as Boylston street. Perhaps Commonwealth avenue would feel it less than any other street, because of its superior width. I think it would then become the avenue of that section, rather than Beacon street be the avenue of that section, as it now is.

Q. In your judgment, what other real estate in the West End, say on the west slope of Beacon hill, would sympathize?

A. I don't think the estates on the hill would be affected very materially, that is, up so high; I think the breezes would reach the top of the hill whatever you did in the bed of the river.

Q. Take the bottom of the slope?

A. On the bottom of the slope there would be a scale, I think, which would recede as you went eastward; it would be affected in the vicinity of the river, on the land below the hill, abutting on the hill, very much, and less as you went up the hill.

Q. Is there, in your judgment, likely to be any demand, or any occasion for the filling up of this basin, or any large portion of it, within any reasonable time?

A. I can see no indications that it would be required for many years to come.

Q. Have you arranged this plan? [producing one.]

A. Yes, sir. I colored that to fix in my mind certain proportions.

Q. Explain what the coloring indicates.

A. I took a map of the city and colored it. The yellow color represents that part of the empty basin being bounded by the old Back Bay out as far as Berkeley street, — the empty basin they began filling in in 1856, — and the yellow line, the line between the yellow and the blue, represents the line of the filled land as it existed upon the first day of May last.

Q. The yellow land is filled?

A. The land that has been made since 1856, when the commonwealth and the city and the Water Power Company made their tripartite agreement; the blue represents the water still remaining to be filled; the green represents the marsh land which exists before you strike the hard land upon the other side. Having got these proportions fixed in my mind, I made colorings to show in what manner the territory had been occupied since it had been filled. The red indicates buildings; the vacant lots, even close up to the Public Garden appear by the gaps, and that which is not colored is still vacant land in the market for building purposes.

Q. The broad red marks on this plan indicate all that has been occupied by buildings, of the land filled during the last thirteen years?

A. Yes, sir, as nearly as may be.

Q. Having in view this statement of the amount of vacant land at present in a condition to be built upon, how long would it be, in your judgment, before there would be any demand, any occasion for filling up this basin, even supposing it were desirable to increase the area of the city?

A. I consider that this basin here [indicating on map] is much

more valuable for building purposes than any basin upon the north of the Mill-dam, and at the rate they have progressed, I should think it would be a quarter of a century or the third of a century, twenty-five to thirty-five years, say, before they would fully occupy that basin, the existing basin, with the class of houses they are putting upon it at present. They could occupy it much more rapidly if they would dedicate it to a cheaper class of houses; but to carry out the style with which they have begun the enterprise, I should say, reasoning from analogy, from the rate they have gone on, it would be fair to assume it would take that time.

Q. It would take twenty-five to thirty-five years to occupy the commonwealth's lands?

A. No, sir; the commonwealth owns but a small portion of it. I mean the basin; the part that is colored; the solid land between the hard land of Boston and the hard land of what was Roxbury and Brookline beyond.

Q. Whether the land gained to the city by filling up the present basin of Charles River would be, on the whole, more or less desirable land for occupation than the land which may be obtained by continuing the fillings in the Back Bay?

A. I think I have already expressed the opinion that the land upon the south side of the Mill-dam is more desirable for building, and I think it would get a higher price and a quicker settlement, than land on the north.

Q. Wholly aside from any difference in the cost of filling?

A. Yes, sir, there is a city on this side of it.

Q. Can you illustrate that, by showing the comparative rapidity of the growth of different parts of the basin?

A. The growth has been very unequal, and if anything would make me qualify my opinion in regard to the length of time, it would be the fact of this unequal growth. I said if you dedicated that land to a cheaper class of residences, the growth would be much more rapid. The east section, in the vicinity of

Tremont street and Columbus avenue and the Boston and Providence Railroad, as extended out through the city, — that section has filled up with dwellings much more rapidly than has this more expensive section. A different class of houses has been erected.

Q. Are there any other reasons besides the cheaper class of buildings and the cost of the land?

A. Yes, sir; I think the controlling reason is, the accessibility. The horse railroad runs through Tremont street (that dark line shows it), and gives access to persons living in this vicinity. The steam railroad runs in that direction, and there will probably be a station there [indicating on map], which will take a person quickly to that point; the probabilities of a station at that point are now strong; it was agitated at the last legislature whether the Providence Railroad should not put a station at that point, and in addition to the comparative cost of the land and the cheaper class of buildings, the greater accessibility of this land has caused a much more rapid increase than here.

Q. This [indicating on map] is nearest to the centre in point of actual location?

A. Yes, sir; a man can reach State street quicker from this point than that.

Q. There is nothing to hinder horse railroads in this territory as well as here?

A. Nothing except the deeds of the commonwealth that no horse railroad shall go through Commonwealth avenue.

Q. Whether any horse railroads are likely, for a very considerable period, to be available in this direction towards Brookline at all, like those at the south end?

A. I think the Metropolitan Railroad Company would hesitate before they extended in this direction for the patronage they would get on this land.

Q. Is it not the fact that though the horse railroads, take the Metropolitan, for instance, — is it not the fact that though that

road, towards Roxbury, has a large business to the south and farther out in the country, it had a large business in the old parts of the city and the suburbs which enabled it to give large accommodations to start with, and so has attracted a large population to its borders?

A. The Metropolitan Railroad Company has a large business out that way, but the fact is, they went there before it was built, and that caused buildings to be erected much more rapidly.

Q. The road preceded the population?

A. Yes, sir.

Q. Has not the Metropolitan Railroad Company for some years been trying to get a right to lay a track over the Mill-dam?

A. Not that I remember; I think it was the Brookline people who thought of that project, and I have favored the giving them the right to come down on the north side.

Q. Did not the Metropolitan Company oppose it, on the ground that they were going at some time to lay a track there?

A. I don't think there was ever a question in regard to horse railroads that the Metropolitan Company did not oppose if they did not receive the location.

Q. (By Mr. DERBY.) In regard to the building of a horse railroad in this locality, is it not the fact that you would be obliged to make a right angle to avoid Beacon Hill?

A. Unquestionably, a person who has to reach that point by horse railroad would reach a location there [indicating on map] quite as easy and quicker than at that point; for the reason that a man who lives here must go up to the Providence Railroad station, and then turn at right angles to come here.

Q. Is there any probability that, within any reasonable period, horse railroad accommodations can be provided to anything like the same extent in the neighborhood of Beacon street that they are and will be on Tremont street?

A. No, sir, not as long as Beacon Hill, the Common and Public Garden maintain their present position.

Q. (By Mr. BIRD.) The Metropolitan Company has got to Beacon street on Berkeley street?

A. They have got to it on Clarendon street. They go to the Providence station, and turn through Berkeley street and across Clarendon street. I believe the people who have gone to the outer edge of civilization are trying to persuade them to go out there.

Q. (By Mr. PUTNAM.) In relation to other lands which have been filled up, are you familiar with the part of Boston that is still called the Mill Pond, now occupied by Haymarket square, the Boston and Maine station, and the streets between there and the Charlestown bridges?

A. Yes, sir, I have a general knowledge of that.

Q. How near is that to the central business portions of the city?

A. I suppose you could walk from State street to the Mill Pond lands in eight or ten minutes.

Q. Whether that land commands high prices in the market now?

A. No, sir; it is about the lowest priced land there is in Boston proper.

Q. Is there any reason for supposing that the land that would be obtained by filling up Charles River basin would be any more valuable than that land?

A. I should think not. I should say this has an advantage for dwelling purposes; but when you come to the question of occupation for business purposes, I think the Mill Pond lands are the most convenient, and would command a higher price; they are now occupied by manufacturing to a large extent.

Q. If mercantile business wants to go there, it can get that cheap?

A. Yes, sir; but when it has reached the point that it requires those lands, I take it they will not be cheap at that time.

Q. Whether there is not still ample space near State street for mercantile business to spread upon, which would be more economical and more useful for such business than this land it is proposed to fill up?

A. In my opinion, there is.

Q. What is the value of that land?

A. From one dollar to one dollar and fifty cents; say, averaging one dollar and twenty-five cents.

Q. With the buildings on?

A. No, sir; the cost of the land.

Q. How large an area?

A. I should think an area of some fifteen acres, perhaps; that is, in the vicinity of Lowell, Causeway, Nashua and Billerica streets.

Q. How does that compare with this land on Warren avenue in valuation?

A. The Mill Pond lands would average one dollar and twenty-five cents; Warren avenue would average one dollar and fifty cents now. The Warren avenue lands two years ago would have been below a dollar and a quarter average; but the buildings going up so rapidly in that section have increased the value, until I think it would average one dollar and a half.

Q. Is there any reason for supposing the land which would be obtained by filling the Charles River basin would be more valuable than that?

A. No, sir.

Q. Are there any particular conveniences it has?

A. I think not.

Q. Not so near deep water?

A. Not so near deep water, and not so convenient of access. This land [indicating on map] is in a direct line from the business centre of Boston, through streets of average width, and is convenient of access.

Q. What is the general fact as to the value of property

north of State street as compared with the value of land south of State street?

A. The value of property north of State street has been stationary for the last few years, or has advanced slowly; while that south has advanced rapidly.

Q. Property north of State street has less value than property south?

A. Yes, sir.

Q. Why?

A. Because the tide of business and of population has set in a southern direction, and made a demand in that direction.

Q. Why has it set in that direction?

A. I can see no other reason except that there was room for the city to grow in that direction. The city was hedged in on the other side by this very Charles River.

Q. (By the CHAIRMAN.) Suppose the same amount of money had been spent widening avenues from State street to Charles River that has been spent widening streets from State street south, do you think there would have been this difference?

A. You can get to the North end through wide and fair avenues, and when you reach Haymarket square you have unusually wide avenues.

Q. Where are the wide avenues?

A. Charlestown street and Haverhill street are much wider than the average of Boston streets; they are straight and direct, and yet property upon them has a low price.

Q. They do not reach State street?

A. No, sir; but when you have reached Haymarket square, you are within a short distance, and can go through Union street, which is a street of fair width.

Q. Is not the difference in the value of property north and property south of State street principally caused by the greater facility of access southward?

A. I believe these values are created for commercial pur-

poses and for residences by combinations. I believe the fact that certain parties went in and turned Franklin street into a business street was the result of a combination; people had to go somewhere, and they gave the current a southerly direction.

Q. The city has been aiding that direction by opening wide avenues to the south?

A. I think the city expenditures have followed the demand; they certainly ought not to precede it.

Q. Take this very instance of Franklin street: before this large amount of capital was put into Franklin street, was not the tendency of occupation for commercial purposes in the other direction, up Federal and Congress streets, and did it not at that time take a pretty sharp turn?

A. I hardly observed that thing with care; but I know when the Franklin street experiment was begun, many thought that it was going to be a failure, because the tendency was towards Pearl street.

Q. (By Mr. HILL.) In regard to the value of property on Milk street twenty years ago: it was then occupied by dry goods houses, was it not?

A. The wholesale stores were there.

Q. They have all moved farther south?

A. Yes, sir.

Q. What was the value twenty years ago, as compared with the present value; whether there has been the same rise in Milk street that there has been in Franklin street?

A. No, sir.

Q. Has it not been nearly stationary?

A. As nearly as may be.

Q. As any street in the city?

A. Yes, sir; I think combinations of certain parties making centres of trade or population will give a set to this current of population and trade, which will carry it in one direction rather than in another.

Q. If you take into account the change in the value of money, and the universal change in prices, and the increase in every other kind of property in the city, would you not say that Milk street is not so valuable as it was twenty years ago?

A. I don't know as I can subscribe to that, as I understand your position; but I can make myself understood in this way: Milk street has remained comparatively stationary; has made but little advance, while everything in its vicinity has advanced rapidly. Property in its vicinity has advanced quickly, while this has remained stationary.

Q. An inferior class of business has gone into it?

A. Yes, sir.

Q. Business that generally occupies cheaper streets?

A. That is true; it is not the first-class business street that it was twenty years ago.

Q. (By the CHAIRMAN.) I understand you, in your opinion, if the city had expended as much money in widening avenues towards the North end as they have towards the South end, the value of the property would remain essentially the same as now?

A. It might have received some influence, but could not have held up against the current in the opposite direction. The augmentation might have been considerable, but not like that we have witnessed at the south: take, for instance, this widening of Washington street, and the widening of Hanover street; that will have a tendency to increase prices somewhat; it will check the retrograde movement of real estate in that vicinity.

The CHAIRMAN. Hanover street runs in the wrong direction; my quarrel with Boston is, that it has not expended its money in widening streets which run to the river.

The WITNESS. There is no property that has diminished so much as the very river property we have here; not only upon the river front, but the harbor front. Long Wharf and Central Wharf, and the wharves north of them, are not so valuable to-day in currency as they were in gold thirty years ago.

Q. (By the CHAIRMAN.) Is that true of the land near the railroads?

A. I think it is. Except as they use it for railroad purposes, in trade, and as centreing around these depots, it remains very much as it was when these railroad depots were built.

Q. Has there not come in a good deal of manufacturing about these depots since they were established?

A. That has not, I think, been drawn by the depots.

Q. Was the property as valuable for dwelling-houses as it is now for business purposes?

A. I think it would have been as valuable for dwelling-houses as it now is for the class of business carried on there.

Q. You think the opening of a wide avenue is going to change the value somewhat?

A. Yes, sir; but I should not want to make a large investment down there, even after the avenue is straight and broad; I should want to go in another direction, where, perhaps, there is hardly a building, than to go down there.

Q. (By Mr. KIMBALL.) I understand you to say that the Mill Pond property is the lowest of any property in Boston?

A. Among the lowest. I suppose there are other lands that are as low, but I think this is as low as any of equal area.

Q. You stated the average value at about one dollar twenty-five cents; what for?

A. The average value of the Mill Pond filling.

Q. What property is there in the Mill Pond district that sells for a dollar and a quarter?

A. I suppose I could buy on Billerica and Nashua streets for less than that; on Lowell street for just about that figure; and on Merrimack street and Causeway street for something more. You would then get up, perhaps, as high as a dollar and a half; but it is moderate priced property through that whole section.

Q. You place that at a dollar or a dollar and twenty-five cents; isn't there some of the property worth vastly more than that?

A. Yes, sir.

Q. Will it not carry the average higher than that?

A. No, sir, I don't think it would; while you might find corners worth two dollars and a half, or three dollars, they are so small in area that it would not carry the general average above one dollar and twenty-five cents. I think some of it could be bought for one dollar.

Q. How about Haverhill street?

A. It is not worth more than one dollar and fifty cents, I think.

Q. Would this be as valuable an area as the Mill Pond property?

A. No, sir, I don't think it would; it is further removed by (say) a quarter of a mile.

Q. That is what I should suppose; but what do you think of the value of territory out a thousand feet around here for building purposes? Would it be more valuable for buildings than for mechanical purposes?

A. I think it would be more valuable for buildings than for mechanical purposes.

Q. Do you think a property of that kind would be readily saleable?

A. No, sir, I do not.

Q. You think this would be more desirable up here than that [indicating]?

Yes, sir.

Q. And yet you consider this more valuable here from its near proximity to the Common and Public Garden?

A. Yes, sir.

Q. Then coming in here would not be?

A. Perhaps some of it close to the wall here might be more valuable; but if you went out here a thousand feet, I think the average of that area would be much less valuable.

Q. Notwithstanding it is nearer to business?

A. Yes, sir. Land to-day can be bought at that point near Charles River at a cheaper rate than you can buy it at Chickering's factory on new land.

Q. (By the CHAIRMAN.) What is the price here [indicating] ?

A. I suppose a fair value is one dollar and fifty cents for some, and there is some there for one dollar.

Q. On the north of Charles street ?

A. On the north of Charles street, and streets back of it.

Q. What is the value here, between Mount Vernon and Brimmer streets ?

A. On Brimmer street, that part of it which faces the water, is worth from two dollars and seventy-five cents a foot up to (say) three dollars and fifty cents, for choice corners.

Q. They sell for that at private sale ?

A. Private sale.

Q. (By Mr. KIMBALL.) Suppose this territory were filled up, and covered with a good class of buildings, don't you apprehend that this class of property would sell quite readily ?

A. No, sir, I do not. I believe that if you fill in these flats, this good class of buildings will not go on it.

Q. With this water area in front of it ?

A. I think no one would have much confidence that there would be a water area there long. I think the values we find here are simply the prices obtained, because they believe that the water area will remain; and so they are able to put on a high price accordingly upon the buildings there.

Q. Mr. Hills, don't you know that this is one of the breathing places of the city ? We are told that these are the lungs of the city.

A. Yes, sir, I remember those arguments; and I believe now that if a certain amount of water had been retained, the commonwealth would have sold its land at a greatly increased value.

Q. Now, suppose this filled out here and built upon, wouldn't there be likely to be horse railroad facilities here?

A. Yes, sir, I believe there would. Where there are customers to support a horse railroad, you will find plenty of individuals to start one.

Q. You think this would be more valuable for residences than for mechanical purposes?

A. I think it would be. I think, were it occupied and offered for sale, that mechanical occupations would perhaps seek it; I think no other class of business would seek it.

Q. In preference to the Mill Pond?

A. They might seek it at a certain price; I don't think they would give one dollar and twenty-five cents a foot for it: they might give seventy-five cents a foot for it.

A. Do you think that this land that you are going to fill up with this basin in front of it, is going to sell for one dollar or one dollar and twenty-five cents a foot less than on the Mill-dam?

A. Yes, sir. I may be altogether wrong, but I am sure it would not be sought for dwelling-houses, and commercial business has no occasion for it; and there is no other demand unless for mechanical purposes.

Q. Where do you think they will go?

A. I think they will go out there [indicating] towards Long-wood.

Q. How far is that?

A. That is two miles out there.

Q. Do you think persons would go away out there, after this is all built, or that they would prefer going out here [indicating]?

A. Well, sir, I think that you might perhaps give them inducements enough so as to make them, or a certain class of buildings, settle there. People might build here who would build as high as six or seven or eight thousand dollars; I don't think you would get a higher class than that.

Q. They do build here [indicating] ?

A. Yes, sir.

Q. Now, why is it to be less valuable than this would be here on the basin ?

(By the CHAIRMAN.) That is, why shouldn't that be as valuable for building the same class of houses as this ?

A. For this reason, if for no other, that when these basins shall be all filled, and the sewerage of this great mass shall be pouring into Charles River, you will want a great deal more than five hundred feet wide to make this anything better than a mere sewer. I think that when this shall be filled up, it will be necessary, as a sanitary measure, to excavate Charles River ; and as a sanitary measure, it will be desirable not only to have a deep channel but a wide one. The drainage of this territory (the Back Bay) is sluggish. It is filled only to grade eighteen ; and that is only eight feet above high tide. The mouths of the sewers of this district are closed part of the time ; and there are applications for damages. And there is Church street, which has not sufficient capacity as a reservoir, but that the sewerage water finds its way into the cellars. Extend your sewers a thousand feet, and unless you can make water run up hill, I do not see how you are going to avoid new trouble. And I say nothing but mechanical occupations, where the parties go for a short time to carry on their operations, would settle on a spot that must have a drainage so defective as that.

Q. (By the CHAIRMAN.) What is the difference to the drainage whether the sewers enter on that line, or whether the sewerage is carried out a thousand feet further ?

A. A thousand feet more distance, and you must make a pitch in your sewer.

Q. You are still at about the same level ?

A. Yes, sir, but the great Atlantic will fill that water up to the same level, however far you go.

Q. Suppose you carried it out, what pitch would it have ?

A. In other words, what would be the fall in a thousand feet?

Q. The same fall that it has now?

A. I am not an engineer; but I know the fact that the sewer is covered sixteen hours out of the twenty-four.

Q. [After explanation upon the map.] Now, what is the difference in the discharge of the sewer's matter, whether you leave it here to run out on the flats — that is, from there — at low water, or whether you extend this area, and then empty this matter out into a deep channel?

A. I cannot understand it so. The sewer must still be under the water a greater number of hours.

Q. It isn't under water any more hours. I assume that the bottom of the sewer is going to follow the surface of the flats, so that where it empties it will be at low water mark just as it is there.

A. It has simply a thousand feet further to go, and a sewer that has but little opportunity to discharge. That theory was tried, sir, very extensively, and I believe the city has spent nearly three-quarters of a million dollars in raising the Church Street District.

Q. You are assuming that this sewer is as low as it can be now?

A. Eight feet above high tide. In other words, high tide reaches to within eight feet of the level of the streets, and within two feet of the cellars of that territory. And you have got this territory to go over with sewers. It is not necessary to carry all the sewerage to a new arbitrary channel. This is merely my opinion, not as an expert — I claim to have nothing more than a general knowledge of sewerage.

Q. (By Mr. KIMBALL.) You say that this sewer acts very sluggishly?

A. Yes, sir.

Q. Now, then, suppose this sewer to be brought down here

and to empty into a deep channel, whether or not it would facilitate the flow?

A. I think not. I think there used to be considerable suction at the upper end of the Mill-dam. I used to go in swimming there when I was a boy; and I know I used to find as much of a current as I cared to beat against. The channel gives as much suction as the tide in that open area can give at this time. The tide keeps this sewer shut, and it remains so about sixteen hours of the day, making these sewers simply a reservoir, except for eight hours in the day; and this pressure being removed, the pressure is sufficient to open the gates. Every foot you advance, you lessen the time that it can remain open.

Q. (By Mr. DERBY.) Mr. Hills, I want to ask you this question; whether the value of this property here has not depended to a considerable extent upon its being an extension of the Public Garden?

A. Yes, sir; very materially.

Q. And from its contiguity to Beacon street?

A. Yes, sir; Beacon street lends a great deal to the value of that property. The valuations there are a third higher than they are upon land equally well situated on the other side of the Public Garden.

Q. (By Mr. PUTNAM.) I would like to ask you whether in your observation as assessor you have noticed any peculiar sensitiveness in the valuation of this new-made land, as compared with the upland?

A. Yes, sir.

Q. Will you state how it has been brought to your attention, and what it is?

A. I think the operations in real estate in this vicinity have borne more the character of fancy stocks than real estate. Large prices will be obtained under some circumstances, and then there will be a great reduction. It seems to be particularly sensitive in the locality of these buildings that is called

Prattville. Mr. R. M. Pratt first built a block there, and that stimulated other builders to try the same thing; and that brought a feeling of speculation and demand into that section which had not existed before. It was up as high as six dollars or seven dollars, and then got down to five dollars and three dollars fifty cents, and prices were on a sort of descending scale; and these prices rested on speculation. I think speculation is the only word that gives an idea of the prices. Our appraisers put down their market price according to the sales that had taken place there within one or two months; and it was with great difficulty that we could sustain them at all. We could not sustain them. And the stagnation that has come about for the last ninety days has affected that district more than any other.

Q. Has there been any other matter that has called your attention to the sensitiveness of this land?

A. Yes, sir; I think about 1865-6 there was considerable upward tendency to these lands. The commonwealth lands I speak of particularly; for at that time these over here [designating upon the map] had not been improved. There was a good deal of upward tendency there. About that time the cholera was expected; and the city physician came out with a pamphlet to prove that it either was or was not contagious (I have forgotten which); and a part of his argument was (and he illustrated it by a couple of cases), that the cholera had its worst features, and assumed its most strongly epidemic form, on new-made land. And it created a scare that stopped values and stopped building, I think for some months; and the prejudice exists yet in the minds of some people. I think the effect of that — I call it a "scare," for want of a better word — was to restrain the price here and set it back on the hill.

Q. Prices went up on the hill?

A. Prices went up on the hill; and the market price increased on such streets as Pinckney and Myrtle, — narrow streets, but where there was good drainage. That seemed to be the effect, as I understood and read the signs of the times.

Q. Taking into account the fact that the commonwealth still owns 800,000 or 900,000 feet of made land, what should you say of the policy of the commonwealth as a land-holder, in filling up this Charles River basin?

A. I think the bare discussion of it would reduce it a very small per cent; perhaps five.

Q. What would be the effect of doing it?

A. The effect of doing it, I think, would be fully twenty-five per cent on vacant land in that vicinity.

Q. (By the CHAIRMAN.) Do you think the introduction of more land into the market would affect the price of commonwealth lands now? Due to what cause? To the bringing of more land into the market? Or do you assume that the sanitary conditions influence this feeling?

A. Sanitary conditions, and then there is another condition which will affect it very much. There is a sort of fashion, or style, or prestige about Beacon street, and that locality, which gives these fancy values. As to the real actual value for the land, I do not think it is worth anything like the sum it takes to buy it. Take away the reasons which induced these people to build these high cost houses, and they would take up their position and go somewhere else. Perhaps the loss to the community would not be so much as might at first seem; because wherever they should locate and make the fashionable centre of the town they would increase the valuation, and diminish that of the locality from whence they came. I think I can make myself clear when I speak of dollars and cents. We can on Beacon street and in the vicinity of the Public Garden, make a valuation of eight dollars a square foot hold a great deal easier than we can five dollars a foot exactly opposite the Public Garden on Boylston street; and so far as the land is concerned, that on Boylston street is the better of the two; for the reason that it is best adapted for house-lots, while near to Beacon street there are various stables and edifices not of a desirable char-

acter. And yet upon Beacon street eight dollars a foot will hold better than five dollars will on Boylston street, and I know of but little reason for it except valuation.

Q. We understand you to say, that this property all would be less valuable if this class of people should be moved out of town?

A. I did express that opinion.

Q. And that you infer that it was more valuable on account of these open spaces?

A. I do.

Q. Then it would be less valuable, if it should be filled with houses?

A. Yes, sir, for my purposes.

Q. Do you mean to say that you prefer houses looking out on the railroad track?

A. The point that I spoke of on Boylston street, opposite the Public Garden, is not opposite the freight houses, but is opposite the passenger station, which is a sightly building.

Q. (By Mr. PUTNAM.) Whether the value of the lands on St. James's Park, which have been built up and occupied lately, does not depend very largely on its having that broad space near it occupied by the Providence Railroad?

A. I think, sir, these houses would not be worth much without that; although I can say that the railroad does injure the property to the extent of about fifty cents a foot on that street.

Q. Is the advantage of having this open space greater than the injury?

A. Yes, sir. If on the small yards attached to these estates they were to put up edifices, it would decrease the value of the land another half dollar a foot, certainly.

Q. (By Mr. DERBY.) I will ask you, sir, in reference to the value of property on Charles street. You spoke of the property down by Cambridge street and Craigie's bridge being worth one dollar and fifty cents per foot?

A. Yes, sir.

Q. Just as you come on to Charles street, what is the value of property there?

A. Well, sir, along on Charles street, for a hundred feet deep, property is worth about three dollars a foot. Where it is so deep that the rear lot cannot be used except in connection with the flat, I suppose the rear land is worth about half as much; perhaps one dollar and fifty cents or one dollar and seventy-five; but as soon as you reach the district where manufacturing begins, land in the vicinity of the jail, and Mason & Hamlin's organ factory, and the Coolidge building, the prices cannot be maintained. The people who live here between Cambridge street and Beacon street maintain a certain style of house and neighborhood, which enables them to maintain a price of three dollars a foot.

Q. The Coolidge building is one used for manufacturing purposes?

A. Yes, sir. And although on the corner of a broad street, we cannot make as much of a price hold as we can on this side, which is not a corner.

Q. Then, as you come down towards Brimmer street, how is the price there?

A. I think the price there is from two dollars and fifty cents per foot to three dollars on the river there, and half a dollar higher on the corners; and about half a dollar less on the other side, which was cut off from the river.

Q. They get occasional apertures on these streets where they can look out on to this open sheet of water?

A. A man in the centre of a block wouldn't see much; those living at the corners might.

Q. Then, as you come to Beacon street, I would call attention to this fact, this land is occupied very much, isn't it, by stables?

A. Yes, sir.

Q. What is the value of that land?

A. Well, sir, the value of that land is maintained, I think there much better than one would suppose. These people who live in these high cost houses like to have a stable near them, and the prices, I think, are fully equal to other prices in the vicinity; that is, wherever they choose to locate. There is a place near Lime street, where they have not seen fit to go; there it would not range as much as two dollars.

Q. I will ask you, sir, how far the fact that the commonwealth had a dam already made before the filling in of lands which it has sold heretofore has had an effect upon the profit of those lands?

A. It would save them the expense of a sea-wall, certainly; and that must be a very important item. And they had a shallow basin; that is another important item.

Q. And has the proximity to Beacon street had an influence also upon the price for which the lands have been sold?

A. The character and style of Beacon street have carried the commonwealth lands at a very large advance over the rate that has been obtained by the Boston Water Power Company in this section.

Q. And independently of the style and character of Beacon street, has not the fact of having this area ready to be filled up and a dam already built, and being no charge to them, added materially to the profit to be gained to them?

A. Of course it has. If the State has one-third of the area, of course that is one-third of the value of these lots.

Q. And to estimate and compare this area with that, what would be a final conclusion? You have made some comparison between the Mill Pond and this; what would be the comparison between the two?

A. I don't know that I can express myself any better than by saying that if you would give me these flats, I would not agree to fill them without a good strong guaranty of a million dollars. I would not to-day take them as a gift, and be obliged to fill them.

Q. (By Mr. CROSBY.) Can you show where the old original area of that opening of the basin was before they began to fill at all?

A. [Explained by reference to map.]

Q. The question I want to ask you is, whether you have any idea of the comparative amount of filling which has already been done here, and occupied, or more or less occupied?

A. Well, sir, I should say, including the South Bay, and calling that all the filled land which was outside of the line of high water before the Mill-dam was built, that this area built here might equal one-third of the other,—the area colored in yellow.

Q. Then since 1837 there has been found necessary to fill, (and a large proportion of it is occupied), three times as much area as is represented here [indicating upon map]?

A. Twice as much.

Q. Three times as much has been filled since 1837?

A. The idea I tried to convey was, that, let that represent one-third, including the South Bay, which is not occupied —

Q. My question is, how much has been filled?

A. That would reduce my idea. Well, no material difference, because South Bay is partly filled up.

Q. About three times as much has been filled?

A. My outside figure included South Bay; and that an area twice as much as that has been filled. [Explained in connection with the map.]

Q. (By Mr. KIMBALL.) I understood you, I think, to say, that if this were filled out around here, it would materially reduce the value of the property around in this territory?

A. Yes, sir.

Q. Suppose it were filled up, and an esplanade built out there?

A. I think it would improve it; just as much as for instance the Public Garden and the Common give a greater value than the Charles River in its present condition. My answer

ought to be qualified, if the laying out of a park would tend to render the drainage of the district imperfect; of course no man will live where he cannot have a house that can be drained.

Q. (By Mr. PUTNAM.) Mr. Hills, did you put any limit to this proposed park in your answer to Mr. Kimball?

A. My idea was, that an open area, made beautiful either by nature or by art, will enhance the value of property surrounding it.

Q. But suppose an open area of filled land, made beautiful by art, were interposed between these houses and this water, would not the width of that area be a material element to be considered?

A. Yes, sir; the very much comes in there very strongly. For instance, if a man lives opposite to Union Park, or any other beautiful park, the value of his property is very much enhanced by that reservation. Let him be opposite the Public Garden, and the value of his property is enhanced twenty-five or twenty-six per cent; and if on the Common, forty-eight per cent; and so it is correspondingly increased.

Q. But suppose it should be proposed to put in an esplanade there, should you think it would be an advantage to the inhabitants of Beacon street?

A. It would depend upon how much they beautified it.

Q. When you answered Mr. Kimball in regard to having an esplanade there, did you mean that this esplanade should be something comparatively narrow?

A. I had simply in mind this, sir, that this real estate has a value by reason of its distant outlook. I do not consider that, if the drainage was taken care of, if the water was simply converted into land for ornamental purposes, it would deteriorate the value; on the contrary, I think it would improve it.

TESTIMONY OF GRENVILLE T. W. BRAMAN, Esq.

Q. (By Mr. PUTNAM.) Mr. Braman, what has been your occupation for the last eight or ten years?

A. Well, real estate.

Q. Dealing in real estate?

A. Yes, sir.

Q. Have you been treasurer of the Water Power Company?

A. Yes, sir.

Q. Have you had dealings in real estate in the Back Bay, so called; and if so, to what extent?

A. I have sold a great deal of property that has been sold by the Water Power Company within the last nine years, as at present filled.

Q. Are you familiar, sir, with values of real estate in the neighborhood of the Milldam, and in the neighborhood of Brimmer and Charles streets?

A. I am.

Q. Mr. Braman, what, in your judgment, would be the effect upon the values of land bordering upon the Charles River of such a filling up of a portion of the basin of Charles River adjoining these lands as proposed by the plan furnished by the committee?

A. I think it would depreciate the property bordering on the river from twenty to twenty-five per cent, and undoubtedly it would depreciate the adjoining property.

Q. How far would the influence of that depreciation extend?

A. Well, I think it would extend to Boylston street in a ratio, — what, I could not tell, but I know the value is dependent upon the value of houses erected upon Beacon street, and of course the depreciation of those houses will tend to depreciate all the property in that neighborhood.

Q. When you speak of twenty or twenty-five per cent, do

you have in mind the whole property built upon or not built upon, or merely that which has been improved?

A. I am speaking of houses particularly, and I think there will be greater depreciation upon the land. The depreciation in the value of these houses would not be so much as it would be of the land. Take a lot of land on the north side of Beacon street for five dollars a foot — you can easily call it that — and it would not bring more than half that on the other side of these same streets.

Q. Have you had any experience in the cost of filling, Mr. Braman, — in the filling up of flats?

A. Yes, sir; in the filling by the Boston Water Power Company.

Q. What, in your judgment, would it cost to fill this land, taking the plan which the committee furnish?

A. At this time?

Q. Yes, sir.

A. I have made some little calculation, and I estimate that with the sea-walls necessary to be built it would cost about a dollar a foot for saleable lands.

Q. How much did you count out for streets?

A. From a third to a fourth; I think it would take more than a quarter.

Q. (By the CHAIRMAN.) What do you estimate the cost of the sea-wall?

A. I think it would be a hundred dollars a foot.

Q. (By Mr. DERBY.) How large an area did you estimate?

A. Well, I didn't go into it very precisely. I calculated for making a sea-wall in deep water.

Q. How large an area did you apply your estimate to?

A. I applied it from the cross-dam (Parker street) down.

Q. At what width? How large a channel did you leave?

A. I only took this side, and drew a line from Parker street to Cambridge bridge.

Q. That would leave how large a channel?

A. It would depend upon how far the line would come down on the Cambridge side.

Q. You have only made one sea-wall; but then the price of land would depend upon the number of feet of land to which the sea-wall was applied. If you apply it to four million feet, it would cost more per foot.

A. I only applied it to the land on this side.

Q. (By the CHAIRMAN.) Where did you estimate your filling to come from?

A. Well, I figured my filling that it would be less than six dollars a square; it might cost seven or eight. I believe now the city are paying seven for filling the Church Street District.

Q. (By Mr. DERBY.) That is eight yards?

A. Yes, sir.

Q. (By the CHAIRMAN.) You own property in this neighborhood?

A. Yes, sir; I am interested in property on Charles street, between Pinckney street and Chestnut street.

Q. (By Mr. DERBY.) Mr. Braman, you have been familiar with that locality from boyhood?

A. I was born there, sir, on Charles River.

Q. I want to ask you as to the comparative depth of the two sides of the Mill-dam. What is the difference (I am speaking of the water area which is now open on the north side of where the commonwealth has built up), what would be the difference between them?

A. Well, quite a difference; because, of course, we all know that the empty basin was flats, and a great deal of it and of the marshes was out of the water; and here close by my house there is twelve feet of water, right by my house on Brimmer street.

Q. Take the whole range for a thousand feet out from the Mill-dam, do any flats show themselves within one or two thousand feet of your place?

A. From my house on Brimmer street there are probably twenty-five hundred feet before there are any flats. I think there are one or two shoal places.

Q. All the way down to Cambridge bridge no flats?

A. No, sir.

Q. But up towards the cross-dam there is a little shoal?

A. I think there is a little shoal place. I know they get aground there in boats.

Q. As to the regular current, do you have a free current?

A. Yes, sir.

Q. The water does not stagnate there?

A. No, sir. I perceive by this surface in the rear of Brimmer street that Mr. Boschke made from twelve to sixteen feet of water directly back of my house.

Q. (By Mr. KIMBALL.) Do you know whether the filling in below Brimmer street had any effect on the Charles street property?

A. My impression is that the people who owned houses on Charles street felt that the time must come when it would be filled, because they knew that a sea-wall would have to be built, and I think the people are moving down from Charles street on to this property. I don't know that it embraced the Charles street property until then; I think not.

Q. The current sweeps pretty strong by your house?

A. Very.

Q. (By Mr. BAKER.) Is the tide water in that locality offensive?

A. I do not know that it is offensive in any way at all.

Adjourned.

SATURDAY, NOV. 27, 1869.

The Committee met at 9½ o'clock, A. M., and the introduction of testimony was resumed.

TESTIMONY OF DUNCAN McBEAN THAXTER, M. D.

Q. (By Mr. INGALLS.) Doctor Thaxter, you are a physician in Boston?

A. Yes, sir.

Q. You practise in South Boston, do you not?

A. I have for about twenty years.

Q. You are also one of the surgeons of the City Hospital?

A. I am.

Q. How long have you been?

A. Ever since the hospital was opened.

Q. Wont you be kind enough to look at this plan, and let me ask you, considering there should be a space filled up from West Boston bridge to the cross-dam, 1,000 or 1,400 feet from Beacon street out into the Charles River, what would be the effect upon the sanitary condition of the city of having this space filled up, and streets laid out, and buildings erected?

(By the CHAIRMAN.) Why not put your questions upon this point in this shape: what would be the effect of fillings from this point [*the sea-wall in the rear of Beacon street*] 1,000 feet, or not to exceed 1,500 feet? Or say what would be the effect of filling up north of Beacon street, five, ten, fifteen hundred, or two thousand feet? We have not adopted any particular extent of filling. If you can tell us that it would be safe to fill in a thousand feet, and not two thousand feet, we might set it at one thousand feet.

A. Unquestionably in my mind any diminution in this surface would have a correspondingly detrimental effect upon the sanitary condition of the city. This space like others in and about the city has been likened to the lungs of the city, and any diminution of this lung must of course be felt, I think through the whole city, but more especially in this neighborhood. I believe the reason, or one of the reasons why Boston has always

been considered so healthy is, that together with its undulating surface it has on both sides of it, being a peninsula, these open spaces where the tide flows in and out twice every twenty-four hours, and over which the winds blow and remove the vitiated atmosphere which always hangs over crowded spaces. Of course any diminution of this surface by building upon it adds to the space to be ventilated, and so far as this space is concerned, must diminish the means of ventilation.

Q. (By Mr. INGALLS.) You think the evil effects would not be confined to the borders of these flats?

A. I should think not, sir.

Q. How far should you think the beneficial effects of the winds passing over this open space of water were felt?

A. In the summer season is the time when perhaps any interference with these flats would be most felt. Our prevailing winds, as the gentlemen are aware, are southwest; I do not know why they are not felt clear across the city; Boston is narrow.

Q. Whether or not it is any advantage for the wind to blow across salt water which is changed twice a day? Whether it is not better than the wind blowing across the land?

A. Certainly. There are certain exhalations from the land, which you will not have from the water surface, which is renewed twice daily from the sea.

Q. In your experience, as practising physician and surgeon at the hospital, have you ever noticed any difference as to the health of different localities of the city?

A. Yes, sir.

Q. How does the health of the population on the west side of Beacon Hill compare with that of other portions of the city?

A. As compared with the North end, the difference is very great. Of course the more open the streets and the more freely the air has access to the buildings the better. The health of the inhabitants is inferior where the streets are crowded

and the air cannot be constantly renewed, and where of course it is constantly acting to promote disease. This is very noticeable, especially in surgical cases and in young children. It is a very well known fact that an amputation in the country will in the majority of cases heal up in half the time that it will in a crowded city. Young children, we all know, depend, as to their health, on the condition of the atmosphere to a very great extent.

Q. (By Mr. DERBY.) You spoke of the exhalations from the land. Is not there a healthy emanation from salt water?

A. Yes, sir.

Q. Is it a fact that cattle require less salt that are kept in such a locality as this?

A. They would obtain more from the saline growth as felt in the air.

Q. (By Mr. HILL.) I should like to ask whether, independently of any exhalation, with the breezes blowing across the water in the tidal basins where the water is changed twice a day — whether the air is not cooler than it would be with the wind blowing over the same amount of land, no matter how open it may be, or how ornamental it may be made?

A. Yes, sir; there is no doubt about that.

Q. You think so far as the health of the city is concerned, the diminution of the water basin of the Charles River would be injurious, even if the land were laid out as a pleasure ground?

A. Yes, sir.

Q. You think an area of tidal water would be better?

A. Yes, sir.

Q. Then do I understand that any material reduction of the Charles River basin would be likely to deteriorate the influence of this open space upon the health of the city of Boston?

A. I so stated.

Q. Independently of the exhalations?

A. Yes, sir.

Q. (By Mr. DERBY.) Whether in cases of cholera it has clung very much to the made land in its visits?

A. Yes, sir.

Q. (By Mr. ALLEN.) Does the same class of population live in this locality as lives in other portions of the city where the death rate has been stated to be larger?

A. I do not think the class of population makes any difference. It is the manner in which they live, and the character of the houses in which they live, and the character of the localities as they are laid out.

Q. Does not the manner in which they live make some difference in the cases at the North end?

A. I said that that was one of the causes.

Q. (By the CHAIRMAN.) Somebody has said, doctor, that analogies are very delusive. Are not analogies in medical science apt to be delusive?

A. It may be.

Q. Now, what propriety can there be in placing the lungs of a city on the side of the city? What possible analogy is there between the — I was going to say lungs, but I wont use that word — we are indebted to Dr. Holmes for starting that idea of analogy to the lungs — what possible analogy is there between this aperture outside of the city and the lungs of a person? We can understand that an area in the centre of a city might bear some analogy to the lungs of a person, but you would not place the lungs in a man's toes, would you?

A. Oh, if the lungs perform the same office in his toes as they do in his chest, I cannot see that it would make any difference.

Q. But there is a very pregnant "if" there.

A. The lungs, it is well known, serve to purify the blood in the human system, by bringing it in contact with the air, and combining with it a portion of the air. Nature, as you have

suggested, has placed them near the great vital organ of the body, the centre of circulation. I would not undertake to explain why nature did it in that case, but I will say that these open areas are likened to the lungs because they perform for the city a similar office to that which the lungs perform for the human system; that is, they purify the air, which is the vital element in the city, so far as the life of the inhabitants is concerned. A large city has a much greater space to be purified than a man's body; and whereas a central organ might be necessary for a man, a city might require many similar organs scattered around on the margin of the city.

Q. Where are the most unhealthy parts of Boston?

A. Some portions of the North end, I believe, and about some of the streets on Fort Hill. There are certain localities in South Boston that have been particularly marked.

Q. Isn't this a fact, that the most unhealthy portions of the city have been those near the borders of the city? Is not that so at the North end to-day, and on Broad street, and in South Boston, where they are most exposed to the prevalent winds from the northeast and the eastward?

A. The localities that have been mentioned have been, undoubtedly, some of the most unhealthy.

Q. And always have been?

A. Yes, sir.

Q. Showing that the cause of that unhealthiness was something more than a question of ventilation?

A. In those particular localities, the effect of their being exposed to the winds has not freed them, has not counteracted the other causes.

Q. But it does show that the nearness to a tidal area does not counteract these causes — which I think every medical gentleman, and you, certainly, will admit are the prevailing causes of disease, — crowded houses, bad ventilation, etc. Now, are not the real lungs of every large city, if there is any such thing

the atmosphere overhead? Must not that be necessarily a large source of pure air to the streets?

A. I do not know as I understand your question.

Q. Must not a large city necessarily draw its pure air from the sweep of the winds overhead instead of getting them through the city?

A. No, sir, I should say not; I should say both are necessary.

Q. (By Mr. CROSBY.) I would like to ask the doctor one question. I understood him to testify that the prevailing winds were from the southwest. I should like to have him show me by the map what effect the southwest winds would have upon the city of Boston?

A. I did not say the whole of the city, but that portion of the city. [*Explained as to direction of wind, in connection with map.*] I said southwest; if I were going to add anything, I should say west.

Q. I want an expression from you as to how much the effect would be of a thousand or fifteen hundred feet of area here, upon the city of Boston?

A. Proportionally just so much as you diminish the area. I take it that when you undertake to narrow down the effects of the wind by the map, you cannot tell much about it. The current sets in this direction [indicating].

Q. (By the CHAIRMAN.) Now, then, here is another matter, doctor. [*Draws a line on map indicating a line of 1,500 feet from sea-wall in rear of Beacon street.*] Suppose that should be filled up to that line, would not this territory be the best ventilated territory in the whole city of Boston?

Mr. INGALLS. How much of a channel do you propose to leave? How wide a channel?

The CHAIRMAN. We do not propose — nobody proposes — to go farther than that point, the end of the bridge. Now, suppose that it is filled out fifteen hundred feet, or nineteen hun-

dred feet, which carries us clear of the five hundred feet line; and then looking upon the map here, and seeing the Common here, and the Public Garden there, which really act as the lungs of this portion of the city, — now, then, I ask you as a medical expert, if this is filled up here as it has been proposed, or as I have marked here, would not this be the best ventilated portion of all Boston?

A. You diminish the channel, if I understand it, two-thirds.

Q. Well, suppose it is all filled up?

A. No, sir; I should say there was the best ventilated part of Boston [indicating].

Q. Where is that?

A. South Boston. If you can find a place anywhere within a hundred miles of Boston which is any better ventilated, I don't know it.

Q. But I mean in the city proper; isn't that the best ventilated portion of Boston?

A. Undoubtedly, it ought to be the best ventilated.

Q. Is there any doubt about it?

A. All I can say is, I cannot say what they will fill in there, but on the plan of leaving it an open space, it ought to be.

Q. But filled up to this line, wouldn't it be the best ventilated portion of the city of Boston?

A. Yes, sir; it will be very well ventilated — one of the best, but not *the* best.

Q. (By Mr. CROSBY.) Are you acquainted with that portion of territory that lies southwest of the Charles River?

A. You mean on the Cambridge shores?

Q. Whatever territory it is — I am not familiar enough to designate precisely — what is the character of this territory that lies to the southwest of the Charles River, and adjoining this land?

A. My impression is, if I get the direction right, that it is a marshy shore.

Q. It would depend something upon the character of the winds coming across that territory, would it not? Going into this sanitary matter, I should like to know what the territory is that lies back in the southwest direction from this, over which these winds blow. Would there be likely to blow vitiated air coming over this wide sweep of rich open country?

A. So far as I know, there is no objection.

Q. What I wanted to ascertain was, whether there was anything in the character of these winds coming over that expanse of territory which would require the health-giving properties of these waters in order to make them safe after they reach the city?

A. I should have to answer in this way; that taking away anything that would deprive the city of the purity of its atmosphere is detrimental to it.

Q. Do you think that the area of this water-surface, as it is now, bears so important a part in the ventilation of the city that it is essential that it should be kept open, in order that these winds may blow over it.

A. Well, I suppose that these questions have been put to me in view of what may take place hereafter. If the whole territory is to be left as it is now, perhaps it is not essential; but I suppose we are all looking forward to what will take place hereafter. There is no knowing how soon these vacant lots may be filled. And I suppose that every house and factory, or anything that may be put there, adds to the causes of vitiation.

Q. (By the CHAIRMAN.) You think the character, the health-giving, health-bearing, health influencing quality of these winds is very little affected by the fact of blowing over flats upon which the sewage of this Back Bay territory is emptied?

A. The wind blowing over flats where sewage is emptied of course must be vitiated by it.

Q. Then, what would be the effect, as regards ventilation, if, instead of leaving it as it is now, with these flats exposed on

both sides at low water, a portion should be filled up, and the rest dredged, so that the whole of this area should at all times be covered with water?

A. Thereby keeping the filth from the sewers covered?

Q. Under water all the time.

A. So far as that goes, it would be undoubtedly depriving the air of so much vitiation.

Q. Suppose there should be here such a filling as to cover all the flats now bare at low water, and leaving pretty much the same area that is now covered with water, covered with water all the time?

A. So far as you cover the sewers, it is an advantage; but in covering out here, you are covering the space with inhabitants, and you are widening the space to be ventilated, and removing the means of ventilation from the west of the city. That would be a disadvantage.

TESTIMONY OF HENRY G. CLARK, M. D.

Q. (By Mr. PUTNAM.) Dr. Clark, you have been City Physician of the city of Boston, have you not?

A. Yes, sir; I have.

Q. During what years?

A. From 1849 to 1860, ten or eleven years.

Q. (By Mr. DERBY.) Connected with the sanitary commission, I think, also?

A. Yes, sir, as Inspector-in-chief of the General Hospitals of the Army.

Q. (By Mr. PUTNAM.) Have you given any particular attention to the question of the sanitary conditions of the city?

A. I have, a great deal.

Q. What part of the city do you live in?

A. I live on Beacon street, near Park street.

Q. Between the Tremont House and Park street?

A. Yes, sir.

Q. Dr. Clark, are you familiar with these parts of the city, north and west, that would be affected by the filling up of Charles River?

A. Yes, sir, I am; with all parts; particularly the older parts of the city.

Q. Will you be kind enough to say what in your judgment would be the effect, in a sanitary point of view, of filling up any large part — say twelve hundred to fifteen hundred feet from the present sea-wall — of the basin of the Charles River, whether left open and ornamented, or covered with dwelling-houses?

A. I think it would be decidedly injurious as a sanitary measure.

Q. How would that be, sir? Will you explain your views on the subject?

A. In the first place, it would be detrimental in the matter of drainage, which lies at the bottom of all improvements of sanitary conditions. It would make the drainage less perfect. It would remove from the vicinity of the houses in this part of the city the even cooling medium of fresh water.

Q. How about the ventilation, sir, of the northern part of the city — say, north of Beacon street?

A. I think the whole of it would be very much affected. We have all the required evidence in the removal of the salt water from the Public Garden at the foot of Charles street. The temperature has been very much changed, as I remember it, since it used to come up there through the flood-gates of the Mill-dam; and especially since the time when it used to come in freely from the sea before that was built. It was very much injured by the construction of the Mill-dam, and more still by the filling inside of it. The drainage has been very much obstructed, and the difficulties of proper drainage much increased.

Q. What is the value, if there is any value, to large and

densely populated cities, of large open spaces, at frequent intervals?

A. They are absolutely necessary to the sanitary condition of large towns. And if these spaces consist of good solid land, with trees and foliage, or of bodies of deep water, especially of salt water, it is better still.

Q. Have you noticed, sir, in your drives and walks about that part of the city, on the west side of Beacon Hill, and over towards the hospital, and that direction — have you noticed, in the summer time, the effects of this salt water basin upon the western portion of the city?

A. Always — yes, sir.

Q. What is the effect of it?

A. The pleasant cooling effect upon the atmosphere in summer time is very marked indeed. The temperature is certainly and uniformly lowered by the air passing over the water.

Q. From your experience as a physician, and your knowledge of sanitary subjects, should you or not expect any effect on the death rate or disease in that part of the city from having this closed up?

A. The older parts that remain?

Q. Upon the central part of the city, — say, north of Beacon street, and upon the slope of the hill?

A. I think it would. It would certainly diminish its healthy conditions.

Q. Will you state, if you know, whether there is now noticed any difference in the facility and success with which operations can be performed in crowded cities as compared with the country?

A. Always very much less in the cities.

Q. That is to say, for a delicate surgical operation you would consider the chance of a cure better in the country than in the city, as a general thing?

A. With the same conveniences for operating, the atmos-

phere in an open space, or in the country, is much better than in closer parts of a large city.

Q. Is that practically recognized, or ascertained?

A. Yes, sir; and in a single house than in a hospital, if it is a well ventilated house. The accumulation of bodies is an injury to the salubrity of the air, whether healthy or diseased, and of course especially if the latter. The particular objection to filling up the channel-water of the Charles River is, that as it now sweeps by the rear of Beacon, Brimmer and Charles streets it effectually removes the *detritus* from the drains; no substitute could be found for it. I think the river, as it now runs, of the greatest importance as the means of carrying off the sewage of the city. The general system of the drainage is already too defective.

Q. Is there any observable difference between the sanitary condition of made lands in the city and of the natural land; take a portion of the city where there have been made lands that have existed for a considerable time?

A. Yes, sir. On the made lands of South Cove, and the Mill Pond, and in the neighborhood of Fort Hill; in fact, on all the lands which have been reclaimed from the water, the mortality, in ordinary times, is nearly six times as great as in the better parts.

Q. These figures, I take it, are the result of your observation as City Physician?

A. Yes, sir. And in case of epidemics, when we have them, they always break out in these districts.

Q. (By Mr. DERBY.) In the new-made lands?

A. Yes, sir. We know exactly where to look for them. The very first cases of cholera that occurred at the time of its visit here in 1849 were on the Back Bay, in a place called Allen's Block on Tremont street, near the Roxbury line; and I think the next was in the lower part of Broad street, on Bread street.

Q. I would inquire of you, sir, in regard to the material used

for filling, whether, where you fill in with the refuse of the city, etc., it does not make the soil much worse than filling which is brought from the country?

A. Certainly.

Q. And the existence of any newly filled land has an effect upon that which is adjacent?

A. Filling in, in whatever mode, which excludes the fresh water, is an injury to the solid land above.

Q. Is there not supposed to be an exhalation coming up which finds its way into the upper air?

A. Yes, sir.

Q. Either through cesspools or drains?

A. Yes, sir. That is the case not only in numerous houses in this neighborhood, but also in the district lying between Shawmut avenue and Tremont street. Very many of the people have been compelled to remove. That is perhaps the fault of the imperfect plan of the drainage rather than of the location.

Q. In laying out cities, wouldn't you prefer the natural land, so far as sanitary considerations are concerned, than any filling or encroachment upon the sea?

A. Very much. The worst filling that I know of is the South Cove, which has a bottom composed of dock mud, shavings and the rubbish of the city. That has always been the most sickly part of the city.

Q. Is it the result that a very large part of the South Cove has been devoted to railroads, etc.?

A. That I cannot say, but it has been much deserted by the better class of people for the purposes of residences. Many of these narrow streets became very disagreeable and unhealthy.

Q. (By Mr. HILL.) Dr. Clark, I understand, then, that your conclusions, as the result of your observations, are, that if you reduce substantially the water area in the Charles River it will have a deteriorating influence?

A. Yes; or if the water becomes less deep, or if the territory is uncovered at low tides.

Q. Are you acquainted with that vicinity? Are you down there very often?

A. I have been down there a great deal.

Q. Have you ever noticed how much of the flats is bare at low water?

A. Yes, sir, I have; but I do not believe I could state the proportion with any accuracy. It varies, of course, with the varying fulness of the changing tides.

Q. Have you, from your experience, and from your observation, noticed, or come to a conclusion, as to the effect upon the health of the locality whenever the flats are bare at low water? Whether its effect is such as to make it injurious to the locality?

A. I believe the proportion of flats is quite small in the neighborhood of Charles street. It is deep water.

Q. Do you remember how long they are bare? Can you tell that?

A. I cannot.

Q. Well, do you think that the fact that the flats there may be bare, or a portion of them bare, for one or two hours a day, at low tide is sufficient to lessen seriously the other effects of the air blowing over that basin, filled twice a day with fresh sea water? That is, do you think that that is at all balanced by the fact that at low tide the flats are covered or uncovered?

A. By no means. I think the air from that would be preferable to that from made land. It is not so good as that from deep water, or from a continually full basin.

Q. But nevertheless, as it is there, it is better than to have it filled up solid?

A. Yes, sir.

Q. (By the CHAIRMAN.) With all the sewerage emptying on these flats, do you still think it would be better not to have it covered up?

A. From what section, the Cambridge side?

Q. Well, say, up here. [Indicating upon the map.]

A. I do not think it should stop on the flats, but should be carried off to deep water.

Q. I asked you if you thought, if they continued to empty on these flats, when the population extends up the river, that that would be healthier?

A. No, sir; that would be very objectionable. We had an experience of that below Charles street.

Q. Are the parts of the city in the vicinity of Fort Hill when they get them finished — are they, or not, made lands?

A. They are made lands.

Q. Is there any part of Boston that is not made land, the original *terra firma*, that is particularly unhealthy?

A. No, sir. There is Copp's Hill, at the North end, which is not unhealthy.

Q. How is it with South Boston?

A. The lower parts of South Boston are unhealthy.

Q. Is that, or not, made land?

A. I should think a considerable part of it was made, or partially filled land; I do not know certainly about that; the lower parts, in the region of the railroads, are very sickly, — at least they used to be.

Q. (By Mr. PUTNAM.) Doctor, I will ask you a single question, if you please, in relation to this sewerage. Suppose a large sewer should be built down near Brimmer street, and Charles street, intercepting the sewerage (and also from Beacon street) and entering the channel at a lower point, somewhere down by the gas works, or lower still, and supposed it to be flushed also by Stony Brook, would that remove the objections so far as that is concerned?

A. If properly constructed, it would remove it wholly, I suppose. I do not think the sewerage should empty on the flats at all; it is a very improper use to make of them.

Q. (By Mr. CROSBY.) Then you think the system adopted by the city government is wrong?

A. I do not know what it is.

Mr. HILL. I wish to say, gentlemen, at this point, that I am justified in stating here that if the sewerage of Boston is either injurious to the harbor, or to the health of the people, no matter at what expense, the city is ready to provide some other system than the present. No complaint has been heretofore made to us about its effect at this place; and I do not think we should be called upon unexpectedly to discuss it. If the sewerage there is an injury, it will be merely a temporary one.

Q. (By Mr. CROSBY.) In the summer season, what are the prevailing winds that blow here?

A. Westerly.

Q. Decidedly westerly? Not southwesterly, nor northwesterly?

A. They vary somewhat; they are for the most part rather northwesterly than southwesterly, as nearly west as can be.

Q. Then your opinion as to the prevailing winds and their effect on the city is a little different from that of a physician who has testified before, Dr. Thaxter. You would bring the winds more directly across this part of the city? [Reference to map.] Now, I understand that you testify that the wind blows more westerly, more in the direction of my knife, as it now lies?

A. Yes, sir.

Q. Then the value of this open area as it now exists is for the sake of the healthful properties that it will impart blowing across the city here. The area proposed to be filled lies between this point and that point? [Indicating upon the map.]

A. Yes, sir.

Q. And the advantage of the westerly wind is for its health-giving property, which will blow across the city here?

A. Well, sir, the westerly winds coming upon the city near the corner of the Public Garden, or the junction of Charles

street, and Beacon street, blow up directly over the hill. The westerly wind, whether north or south, is more or less diverted from its course by Beacon Hill, and blows in either case over the hill in very much the same way and almost in the same direction, being only deflected here and there by the streets and buildings.

Q. This area of the city which is ventilated by this open space as it now exists — will you point it out?

A. I should say the whole of it.

Q. Remember that this is the utmost limit on the westerly side, and this is the limit on the easterly side. [Indicating.]

A. On most of the older territory in these parts — that is those parts by the river until it is cut off by the rise of the ground — it is driven around the hill just as it would be driven around the corner of a house. The northwesterly winds would be carried very decidedly in this direction. [Indicating upon the map.] When it is north of west, it would be driven over in this direction. [Indicating.]

Q. Then I would like to ask you the same question as I did Dr. Thaxter in regard to the territory beyond; whether the wind that blows over this space is likely to be vitiated by blowing over the territory that lies up here beyond? [Indicating.]

A. Towards Longwood?

Q. Whatever it is.

A. I think that is very clear of anything offensive as far as I know, although it comes over marsh land.

Q. Anything so far as you are aware?

A. Not until we go towards Brighton and Cambridgeport.

Q. That would be rather out of range?

A. Yes.

Q. You do not think it is necessary, in order to purify these winds, that they should blow over this water area?

A. Why, yes, I do. The salt water and the entire openness and unobstructed character of the neighborhood are great ad-

vantages. If you cover this area with houses, you obstruct these winds.

Q. But you do not consider it is essential in order to purify the air that comes from this district that we should keep this space open?

A. Yes; because if you exclude the heavy tides every day, I think you would soon find it becoming unhealthy.

Q. I am not speaking of that now. The only point is, whether it is necessary to keep that open, to keep this air pure, which comes from the country now?

A. If you bring it over as a bundle of merchandise only, I don't suppose it would alter it at all; but if it comes to us laden with the odors of slaughter-houses, pig-styes and a dirty population, I do.

Q. Then I will ask you the question that the chairman has asked. In this matter I am seeking merely for information. If this space should be built over, — suppose the next thirty years should find this space covered with houses, — would not that be the best ventilated part of the city?

A. No sir; it would be better over here. [Indicating.] I think it is a great injury to this part of the town, filling in here, whatever the character of the buildings and the population may be.

Q. Wouldn't this be better ventilated than any portion would be over here? [Indicating.]

A. It would ventilate these houses at the expense of those above them. It is like taking this property and moving it out into the water. It is as broad as it is long.

Q. That is the experience of the city, is it?

A. Bringing it over an inhabited district would be an injury to it, if you did bring it from the country.

Q. (By the CHAIRMAN.) Do you mean to say when this should be filled up there would be any part of Boston that would be better ventilated than this strip lying between the river and the Common and the Public Garden?

A. Do you mean the old part or the new part?

Q. The whole of it, all that will lie between these two spaces.

A. It would destroy the channel of Charles River to do that, and then of course the whole would be injured.

Q. Whether there would be any part of Boston so well ventilated?

A. I say instead of improving the ventilation you would destroy it.

Q. We only want to know whether after this were done this would not be the best ventilated part of Boston, — I mean the strip here, having the Public Garden behind it?

A. If you do not destroy the water beyond.

Q. (By Mr. CROSBY.) The only proposition has been to move the channel over this way. [Indicating.]

A. If you diminish the channel here down to four hundred feet, it would affect it very materially.

Q. I would ask the doctor further in regard to this, if he remembers the sanitary condition of the South end of the city previous to the filling up in the neighborhood of Tremont and Washington street, when Tremont street — or Suffolk street, as it was then called — was simply like a railroad embankment, made up out of mud; if he remembers what the sanitary condition of that locality was at that time?

A. It was very sickly; there were many cases of cholera there. It is not any better now; it is not filled up yet; it is just as it was, and rather worse for the filling up around it.

Q. Are you aware whether any of the odors which used to be observed in that part of the city, from Dover street down to Castle street (and they used, I think, to come down as far as Pine street and Hollis street) — whether any of these odors still exist, and are noticeable there?

A. I do not know; we have had, in years past, such an odor from this district that we were obliged to close our windows for a long time.

Q. Do you know, sir, how much of this area up here is unfilled?

A. It is not very large; they have filled in the streets and a good many spaces between. I should think Castle street had not been filled at all except at one end. Shawmut avenue has not been filled at the lower part. Suffolk street is not filled.

Q. Do you think that when that part shall be filled up, and filled in a proper way, — not with garbage from the city, but filled properly, — that the health of that part of the city is likely to be improved?

A. Yes, sir; undoubtedly.

Q. You spoke of the sanitary condition of these same districts. I would ask you if you are aware of the character of the filling used in these districts?

A. Yes, sir.

Q. What was it?

A. It was very bad indeed, — dock mud, shavings and the *debris* of the town.

Q. Were there not all sorts of refuse from garbage barrels, etc.?

A. Yes, sir.

Q. Would not that of itself be enough to injure it?

A. It would. There is one element — it is fair to mention it — in regard to the sanitary reports, and that is, that these localities are inhabited by a class of people who die faster than other classes of people, because they do not live decently. That should be some deduction from the cause, but it does not alter the general fact.

Q. Then with these fillings which have been put in in other localities, if these districts were covered with wide streets, and comfortable dwellings, and inhabited by people observing most of the sanitary laws, wouldn't you expect the rate of mortality to decrease?

A. Certainly.

Q. Then all the mortality is not chargeable to the locality?

A. No.

Q. (By Mr. KIMBALL.) You have stated that you think the prevalent winds are west and north of west that come over the Back Bay in summer?

A. Yes, sir, I think they are; especially at night.

Q. Now, don't you know that a westerly wind is a very rare thing?

A. A pure westerly wind?

Q. Yes, sir.

A. I think the west wind is very common here at night, blowing until along towards morning. I think it is very rare that you have a night in summer when there is not a westerly wind.

Q. West, or northwest wind? Is not the northerly wind likely to be a stormy wind?

A. No, sir.

Q. It is a cool wind?

A. It is a clear wind. East of north it becomes stormy.

Q. You think the prevailing winds would be west and northwest?

A. I should think westerly, not always "due west," but westerly.

Q. Shouldn't you think it would be more southwest?

A. Perhaps so; I have not taken any particular observation of it.

Q. You are conversant with the Pine Island nuisance?

A. Yes, sir.

Q. Do you know what winds it would take to bring the odors from this establishment across the city?

A. I should say southerly.

Q. A due westerly wind would be likely to carry it down over South Boston, wouldn't it — down over that region?

A. I don't remember its relation.

Q. It is down in the South Bay ?

A. It would take a northerly or northwesterly wind to do that.

Q. Did you ever hear of any complaints in South Boston of a nuisance from Pine Island ?

A. I don't know that I have.

Q. Wouldn't it be a direct southerly wind that would bring it down here ? [Indicating on the map.]

A. A southerly wind would bring it directly into ward nine, or ward ten, which might be more disagreeable.

Q. Just where the complaints were. Do you remember that they were talked of, and that they were almost continually annoyed there by that smell ?

A. Yes, sir.

Q. Then would not that argue that the winds were southerly, mostly ? From the evidence we have, is it not a fact that the southerly winds are the prevalent ones ?

A. I do not know how frequently the complaints were made.

Q. You probably know as much as I do ?

A. I know that it was mostly in Chester square. That would make it a little east of south. We have often winds from different points of the compass at the same time in different parts of the city.

Q. You have spoken of the cholera on these made lands. Isn't it a fact that one of the worst places was Bread alley or Jacob's steps on Fort Hill ?

A. Jacob's ladder is not a very large part of Fort Hill ; it was a very peculiar place, — boxed in, and cut under and into the hill, rather than placed upon it.

Q. The peculiar locality was high lands ?

A. I think not ; I know that there was not a single fatal case of cholera which originated on the top of Fort Hill. I think the main place of infection was about the area at the foot of Jacob's ladder which ran up over the side of Fort Hill.

Q. (By Mr. CROSBY.) It would not be upon the made lands?

A. No, sir.

Q. (By Mr. KIMBALL.) You say you would be likely to have epidemics on made land. Would you have reason to suppose that that would be the case down on Arlington street and Marlborough street?

A. There might not be, because there the houses are large and not crowded; but still, there would likely to be more cases of epidemic disease there than there would be on this hill, taking an equal area and the same class and an equal number of inhabitants.

Q. But that would be attributable to the closeness of living?

A. No, sir; I say, that with an equal number of inhabitants upon a given area there would be more cases of cholera in this locality than on the solid land of Beacon Hill.

Q. (By Mr. CROSBY.) Would that be so if it were down under the hill?

A. It would then be worse.

Q. The difference of altitude has some effect upon it?

A. Yes.

Q. (By the CHAIRMAN.) But yet the lands on this side of the Back Bay are better ventilated?

A. They are more open to the air.

Q. (By Mr. HILL.) Other things being equal, I understand you to say that made land, no matter how well made it is, is not so healthy as the original soil?

A. Certainly not.

Q. (By the CHAIRMAN.) You say that, so far as you have any vital statistics of the Back Bay lands, they prove very healthy?

A. I cannot give you these statistics.

Q. (By Mr. CROSBY.) I should like to ask the doctor a further question. This land near West Cedar street, which is

not filled land, which has been exposed to the influences of the poor land beyond, whether he expects it to be more healthy when that poor land is filled? I want to ask Dr. Clark if that land would not be more healthy after it is filled than to let it be left open in the way that it has been for the last thirty years?

A. After the Charles River was filled?

Q. No, sir; after the rest is filled.

A. South Cedar street you mean?

Q. Yes, sir.

A. It will be better when it is filled up.

Q. Then there are circumstances in which made land is better than natural land?

A. I think that is true when the natural land is very low, and incapable of being drained.

Q. (By the CHAIRMAN.) You say that the mortality on the made land is six times as great?

A. I so estimate it. I would not say precisely, but it is pretty nearly in that proportion.

Q. And yet that made land is pretty nearly all on the outskirts of the city?

A. No, sir; the Mill Pond lands cut pretty directly in between Copp's Hill and Beacon Hill.

Q. But as a rule, the lands that have been filled have been near the water?

A. Yes, sir; and low lands.

Q. And they are the most unhealthy; showing that the sanitary conditions are controlled by other causes, and not very decided. Is not that very clear?

A. That is one of the things to be considered.

Q. Have you ever had in Boston any epidemic that was more virulent than that in the Maplewood Seminary?

A. That was due to the presence of drains under the house, and to the direct communication of the vaults with its inhabited apartments.

Q. Have you heard of the recent case of a similar nature at Phillips Academy at Exeter; not so fatal as that at Mapewood, but there was a club of young boys who were attacked with typhoid fever?

A. I have not heard of it; but there is generally some fault of drainage, which is the cause of the epidemic in these cases.

Q. And more potent than all causes put together?

A. Often, perhaps generally, yes.

TESTIMONY OF CHARLES E. BUCKINGHAM, M. D.*

Q. (By Mr. INGALLS.) Doctor Buckingham, how long have you been a practising physician in Boston?

A. Twenty-five years last April.

Q. You reside at the South end?

A. I do, sir.

Q. You are one of the consulting physicians at the City Hospital?

A. I am; I was at the opening of the hospital for several years.

Q. Now, doctor, won't you give your opinion as to the effect upon the sanitary condition of the city by any material reduction of the tidal area of the Charles River? Suppose, for instance, if you want a definite proposition, that the filling extends out fourteen hundred feet from Beacon street into the channel?

A. I suppose I am not to be confined in my answers as I should be in court?

Q. No, sir; I want you to give your answers, and then give your reasons for them.

A. So far as the filling up of any particular point is con-

* Professor of Obstetrics and Medical Jurisprudence in Harvard University.

cerned, I know very little about it. I have felt for a long time that the city of Boston was making too much land. On general principles I have been opposed to a filling up to the extent which has already been done, no matter whether it were filled up with shavings and oyster shells and refuse, or whether it were filled up with gravel. Wherever the water has been filled up, no matter what it has been filled with, the filth that is underneath has gradually worked toward the surface. I know that as long ago as when I began business, they were filling in the Back Bay lands. I cannot give you the direction, but I should say south or southwest. I cannot say precisely, but I believe somewhere about the foot of Fayette and Marion and Piedmont streets, they were filling in with mud there, and yet five or six years afterwards, although there had been ten or fifteen feet of gravel placed on top of it, you could not dig down a few feet without finding the effect of this filth which had percolated through this gravel. It is lighter than the sand to be sure in solution, and although the sand when it is first put on falls at an angle of twenty-five or thirty degrees, this filth would gradually work itself up. You go through these streets in this locality in the summer season, the best streets that are built there, and you find that the silver door-plates that have been left for a few days, have been turned by sulphuretted hydrogen that has arisen from the filth of the mud that has been buried in the Back Bay for years. This is noticeable even on some of the houses on Commonwealth avenue.

Q. Whether or not, doctor, the effect of these tidal basins being filled with salt water, which is changed twice a day, and has the wind blowing over it, is very beneficial to the sanitary condition of the city?

A. Well, I should think it would cool the air very much.

Q. Whether or not it is useful for ventilation?

A. I should say that it was, certainly. So far as the direction of the winds is concerned, I cannot say. I have listened to what

has been said here, but I think I should say, if I were asked the question, that the wind blew from the east every three days out of four.

Q. Have you, in your experience, ever noticed the mortality or death rate in any portion of the city?

A. Yes, sir. I have not within a year or two, but during the last two cholera epidemics, I had occasion to look into the matter a good deal, and the made land was the part that was principally afflicted by cholera. Where there were positions on the original soil, they were not troubled by cholera as much as on the made land. Some portions of Fort Hill undoubtedly were, but there was a very potent reason for it,—in the closely crowded style of buildings, and the crowded condition of the houses, and the absence of proper sewerage. I remember one place near Broad street, in what was called Bread street, I believe, where there were a number of cholera cases, and which was not on made land; but still it was where there were three rooms, one within another, and below the ground, and where the only possible means of ventilation was one bulkhead in the cellar door-ways. And then where that long flight of steps was, “Jacob’s Ladder,” as I believe it was called,—there was the drainage from the top of the hill pouring down into this alley-way below where this was, and all the filth and the urine was poured down there. There was a chance for the wind from the harbor to blow up this flight of steps, but yet of course it had to blow over all this filth.

Q. Suppose the channel of Charles River is two thousand feet, and suppose this to be filled up, leaving a channel of five hundred feet, and supposing that in the next twenty-five or thirty years Brookline and Cambridge on the opposite shore should be settled, whether that five hundred feet wide would be as useful for ventilation as the present channel?

A. I should say not. I should say decidedly not. And I cannot conceive — well, I have no right to go any farther than

that. I think that if you took the bridge away from Charles River it would be a good thing.

Q. That is, you think the channel is too much filled up already?

A. I think it is filled up too much. I think if you took away every pier there, it would be a good plan.

Q. (By Mr. KIMBALL.) You think it would be a good plan, I suppose, because there would be pure air, and more of it?

A. I don't know whether there would be any more air, that was not what I considered; it was the general obstruction, and the consequent sinking of the sewage in the channel. I think we ought not to put all the sewage into the river dock or harbor. I think it would be a matter of economy to pump it out, and carry it away from the city.

Q. If the sewage were not there, you would not see the objection?

A. Yes, sir, I should, inasmuch as it would close up a large open area.

Q. Then you do believe in an abundance of good air?

A. Yes, sir, I do believe in an abundance of air, but I do not believe that Commonwealth avenue and those streets are any better than Fayette or Marion streets, on account of their location, but because they are wider.

Q. The sulphuretted hydrogen gets diluted before it gets to the lungs?

A. You don't get quite so much of it.

Q. (By Mr. CROSBY.) You testify then, doctor, that this new area down in the vicinity of Commonwealth avenue is in your opinion decidedly unhealthy?

A. I think it will be.

Q. Are they not affected by the influence of the sulphuretted hydrogen at present?

A. To a certain extent; but I believe that it will be worse, as the effect of the mud and filth on this made land is more perceptible.

Q. You would not recommend an investment there for a residence?

A. Well, sir, I should not. If I had the means to buy on Commonwealth avenue, I think I should take the money and go out of town somewhere.

Q. (By Mr. ALLEN.) Do you mean that in a year to come that will be more unhealthy than it now is?

A. I believe that it will be worse two years hence than it is now, and that it will be worse ten years hence than it will be two years hence. I do not know how many years it is going to take, but I believe that a great many of the houses down there are going to be mechanics' boarding-houses.

Q. (By Mr. CROSBY.) You believe that from the necessity of the case these costly buildings that have been erected there are going to be supplanted by manufacturing establishments and buildings of a poorer class?

A. I believe so.

Q. (By Mr. ALLEN.) And the growth of the city which is going on there at present?

A. I believe it has got to go out of town.

Q. (By Mr. KIMBALL.) You spoke of the mud. You mean the silt from the sewerage; not so much the mud, but the old cesspool?

A. It is both.

Q. Of course that same argument would not apply to filling on a good bottom. Isn't it a fact that the excellent clean gravel which has been spoken of has been the very best substance for this to work through?

A. The difference is, that it would be obliged to work through this, otherwise it would have been right on the top.

Q. But my point is, supposing it had been filled with good, clean, clayey soil, whether or not it would have been hermetically sealed?

A. I think it would have been, if it could have been put on in one complete chunk.

Q. (By Mr. DERBY.) It is apt to force itself up, is it not?

A. Of course it is.

TESTIMONY OF FRANCIS MINOT, M. D.

Q. (By Mr. PUTNAM.) Dr. Minot, how long have you been in practice as a physician in Boston?

A. About twenty-two years.

Q. Where is your residence?

A. I live on Charles street.

Q. How long have you lived on Charles street?

A. Twenty-two years.

Q. You live just round the corner of Charles street?

A. Yes, sir.

Q. Are you well acquainted with the locality?

A. Yes, sir.

Q. Are you familiar with the basin of Charles River?

A. Yes, sir, I have lived in the neighborhood all my life — forty-eight years.

Q. What would be, in your judgment, the sanitary effect of having a portion of the basin filled up upon the rest of the locality adjacent to it?

A. I think it would cut off a great deal of the ventilation from that part of the city; I think it would deprive that part of the city of a very great deal of the cool fresh breeze in the summer, and I think the effect would be injurious generally.

Q. Have you been connected with the management of the "Old Ladies' Home"?

A. Yes, sir.

Q. Where is that?

A. At the bottom of Revere street. The front is on Revere street.

Q. Runs back to the water?

A. Yes, sir.

Q. How many inmates have you there ?

A. The number of inmates is not less than ninety-five, and not over one hundred.

Q. Have you a large and expensive building there ?

A. Yes sir ; quite so.

Q. A charitable institution ?

A. Entirely so ; built entirely by voluntary subscriptions, legacies, and endowments.

Q. Was it located where it is on account of the healthiness of the locality ?

A. Yes, sir ; formerly it was on the opposite side of Charles street, and then they bought land extending from Revere street down to the water.

Q. Now, what has been the condition of that institution since it has been where it is now, backing on the river ? Has it been healthy ?

A. Yes, sir, extremely ; I should say a very healthy place.

Q. To what should you attribute it ?

A. I should say a large part of the effect may be attributed to the situation certainly ; it is open to the west to an unlimited extent, you may say ; it has cool breezes in the summer.

Q. It was built with a view to these advantages, was it not ?

A. Yes, sir.

Q. If this plan of building out to a line twelve hundred feet beyond the present sea-wall in the rear of Beacon street, and filling it up, was carried out, should you expect as favorable a rate of health there as now ?

A. Well, no ; I should think not, sir ; I do not see how it is possible for that house to maintain its perfectly healthy condition, because I think a very important consideration, as I have said, is the situation, which would be destroyed.

Q. The class of patients which you have in your institution are, I take it, as sensitive as almost any other class ?

A. Well, they are all women over sixty years of age, and their health is remarkably good after they come in there.

Q. How large a frontage have you on the river?

A. Well, sir, I have not the least idea as to the number of feet.

Q. It is a very large building?

A. It is a very large building; it has accommodation for one hundred inmates, besides the matron, and servants, etc.

Q. Have you any notion how much it cost?

A. I am sure I do not know, although I have been a manager of it for some time.

Q. (By Mr. DERBY.) More than one patient to the room?

A. Generally one patient to the room, though there are some where there are two; those who prefer can room together.

Q. Then there are from eighty to a hundred rooms?

A. Yes, sir. I should think there must be from eighty to a hundred rooms. There are a hundred inmates. I think there are some rooms in the attic not finished.

Q. (By the CHAIRMAN.) This is on made land?

A. Yes, sir, entirely.

Q. (By Mr. KIMBALL.) And yet you think it is very healthful?

A. We have not had any trouble at all since the land was built up; before it was built up, there was one time when there were two or three epidemics of sickness.

Q. (By Mr. HILL.) Do you know how long the land has been filled up?

A. Where the house stands now?

Q. Yes.

A. I am not sure that I know; I think this house has been occupied about eight years.

Q. (By Mr. DERBY.) The shore was very abrupt, and the channel must have come in near?

A. I think it must be, because the vessels come in and are close to the wall. There are vessels constantly in front of the house.

Q. The river rises rapidly?

A. Yes, sir.

Q. (By Mr. ALLEN.) One witness has testified that the exhalation from new made lands would continue for twenty years, and be more injurious at the end of ten years than at the beginning.

A. I cannot give any information as to that.

Q. (By Mr. CROSBY.) Do you know what kind of land that is which is filled in here near the Mill-dam?

A. I don't know; the last part that was filled in was filled, I believe, with street sweepings, and oyster shells, and other things. I know some gravel was put on top.

Q. But for all that you haven't discovered any injurious effect?

A. I have not seen it.

Q. (By Mr. ALLEN.) You have occupied that land for eight years?

A. Yes, sir, it has been filled up but a few years.

Q. (By Mr. PUTNAM.) You have been connected with the Old Ladies' Home for a number of years. Have you been there as much of late as before?

A. Not so much as before. I am now consulting physician, but go there occasionally.

Q. (By the CHAIRMAN.) If you were asked to say what is the great want of Boston, in order to improve its sanitary condition, what should you say — that is, to improve the sanitary condition of the whole?

A. I am afraid that I could not possibly answer that without a great deal of reflection.

Q. Isn't this the fact, that the seeds of disease and epidemics are invariably in closely crowded populations?

A. Yes, sir, there is no doubt about that on general principles; none at all.

Q. In other words, if you took one of these houses out of the

worst and most unhealthy localities, and placed it in this locality, and have the people eat and drink and sleep just as they do now, they would die just as fast, wouldn't they?

A. Well, I don't know; the situation would be very much more favorable to life.

Q. (By Mr. KIMBALL.) Do you think that an esplanade along here, set out with trees and not occupied, would be injurious?

A. I don't suppose it would do any very great damage.

Q. Do you suppose it would any?

A. I cannot say. But one thing I feel sure of, and that is, that the cool air blowing over that water is of immense benefit to the inmates of the Home. There are old women who come in there who never take baths; you really can hardly induce them to take a bath, and their condition is such as is supposed would, on the whole, be unfavorable to health, and yet they come in there, and the effect is wonderful. I cannot help attributing a great deal of it to the situation of the building and the ventilation.

Q. (By Mr. CROSBY.) Do you introduce better habits?

Q. It is not a hospital; it is a home.

Q. (By the CHAIRMAN.) Is the air cooler there than it is in Brookline?

A. That I cannot say. I know it is a remarkably cool place. And I often, for a portion of the season, used to experience it in the Hospital, when my services were there in the summer time. It was a positive comfort on a hot day to go down there.

Q. (By Mr. DERBY.) What has been the effect of the filling down there upon the cases at the Hospital?

A. I am afraid that it has not been favorable. I think the surgeons, perhaps, would give you more certain information about that; because the diseases are surgical diseases, which are most influenced by the condition of the atmosphere.

Q. (By Mr. CROSBY.) We have asked two or three gentle-

men, and they differ as to the prevailing wind. What is your opinion?

A. I think the prevailing winds are west and southwest. That is my opinion; I cannot say that it is founded upon very much observation.

Q. Have you had any observation of the Pine Island nuisance?

A. No, I do not know anything about that at all.

Q. I should like to ask the same question that has been put by the chairman to a previous witness; and that is, whether if this section should be filled up from the cross-dam (Parker street) here out fifteen hundred feet, or thereabouts, from the line of Beacon street, and so out until you run out to West Boston bridge, and then we will assume, if you please, that it is built up in the same manner in which the section lying next to it is built up, — would not that be in your opinion *one* of the best if not *the* best ventilated parts of the city?

(By the CHAIRMAN.) Observe, here is this large portion which has the open space of the Public Garden and the Common on one side. Is there any other part of the city that will be better ventilated than that?

A. I don't know that there is, sir, unless there is along here, on the shore of South Boston.

Q. (By Mr. CROSBY.) [Explaining positions by reference to the map.] The prevailing winds being as you state, wouldn't this be one of the very best ventilated parts of Boston?

A. Yes, sir. I take it that the direction of the wind is more southeasterly. I have no doubt that that would be the best ventilated place, but at the same time I think this, farther in, would be much less ventilated than it is now.

TESTIMONY OF Dr. CLARK, *re-called*.

Q. (By Mr. PUTNAM.) Dr. Clark, I understand you are one of the Surgeons of the Massachusetts General Hospital?

A. Yes, sir; I am.

Q. I should like to ask you whether the surgeons of the General Hospital have noticed any effect from filling out the lands beyond the hospital, between the hospital and the river.

A. I think the condition of the hospital has been altered somewhat, and since then the air is not so good; the drainage is less good, and we have had cases of hospital gangrene which I think we never have had before.

Q. Hospital gangrene is a diseased condition that comes after operations?

A. After operations or wounds.

Q. That is, the fact is, that the healing after the surgical operation does not progress as favorably as it has before.

A. I do not think it does, and we have had to take more precautions than formerly.

Q. (By Mr. KIMBALL.) You mean to say that the more open ventilation and the better air the better for the hospital?

A. Yes, sir.

Adjourned to Wednesday, December 1st, at 10½ o'clock.

WEDNESDAY, December 1st.

The committee met according to adjournment, the Hon. F. W. Bird in the chair. Mr. Horace Gray and Mr. Edward Atkinson addressed the committee, and the rest of the session was consumed in hearing parties represented by Mr. GEORGE GRIGGS, in reference to the importance of dredging the Charles River, between Boston and Watertown, and improving its navigability. The committee then adjourned till Thursday, December 2d, at 10½ o'clock.

THURSDAY, December 2d.

The committee met according to adjournment, the Hon. F. W. Bird in the chair.

Mr. INGALLS put in evidence the following letters, addressed to Mr. George H. Snelling, in regard to filling in the lands on the Back Bay, and the effect of so doing upon the sanitary condition of the city:—

DORCHESTER, March 30, 1857.

GEORGE H. SNELLING, Esq., *Boston*:

Dear Sir,—I have your note of yesterday now before me, in which you ask for my opinion as to the effect of density of population on its health, and especially as to the effect of various plans of occupying the Back Bay lands on the life and health of the people of Boston, especially of those who may live on those new lands.

The principles involved in your inquiries are fully set forth and established by abundant facts in the various sanitary reports made by order of the British and French Governments, and especially in the two reports of the Health of Towns' Commission in 1846. You will find these reports in the Boston City Library. They should be in the State Library. They should be within the reach of, and consulted by, and familiar to, all legislators, all whose business it is to provide for the public weal. They contain facts and principles, which if known to, and acted upon by our State and city governments, would save great expenditure and loss of money, great loss of time and comfort in sickness and of productive power, and prevent much premature death.

I reviewed these and some other sanitary reports in the Philadelphia Journal of Medical Science, April, 1848. You will find the article on pages 419–51 in that number, which, if you do not find the original reports, will give you their great points. The most important is the effect of density of population on health. That is most strikingly shown in a table which I made and printed in that Review, page 435. I quote it here entire:—

TOWNS.	Population to square mile of builded area.	Number of living to one death.	Average age at death.	Number of deaths in 1,000 living	
				Under five years old.	Over seventy years old.
London.....	50,000	37.38	26½ years.	408	111
Birmingham..	40,000	36.39	—	482	88
Leeds.....	87,256	35.38	21 years.	480	79
Manchester..	100,000	29.64	20 years.	510	60
Liverpool....	138,224	28.75	17 years.	528	54

Some districts of these cities are crowded much more closely than these figures. In one part of London people live in the proportion of 243,000 per square mile; and in a part of Liverpool 460,000 per square mile. In Broad street, Boston, Massachusetts, they had only nine square yards for a person, which is equal to 441,552 per square mile.

I will quote and condense more facts of the same sort found in the English Reports, which show the difference of life in the different parts of the same cities, differently peopled: —

TOWNS.	Districts or Wards.	Density of Population.	Inhabitants to one death.	Average Age.
York,	5 wards,	84 to the acre,	53	—
	13 wards,	248 to the acre,	35	—
Nottingham,	35 districts,	187 to the acre,	—	26.6
	32 districts,	316 to the acre,	—	19.8
Liverpool, .	4 wards,	18½ yards to each person,	28.31	—
	10 wards,	239 yards to each person,	41	—

The same is shown in the growth of towns and condensing of population at different periods. Take Preston, England: —

YEAR.	Population.	Inhabitants to one death.	Average age at death.	Per cent of Deaths.	
				Under five years.	Over five years.
1701	8,000	45	23.679	44.9	55.1
1811	17,065	48	19.998	51.3	48.6
1821	24,575	—	18.942	56.5	43.4
1841	50,131	33	19.54	53.3	46.6
1851	69,542	31	—	60	40

Comparing the rural with the civic or town districts of England : —

Country, 3,559,333 inhabitants, 206 in a square mile, one died in 54.91 living.

City, 3,759,002 inhabitants, 5,045 in a square mile; one died in 38.16 living.

In the former 20 per cent, and in the latter 9 per cent, survived their seventieth year. That is, for every one hundred that died in the country, one hundred and forty-five died in the cities, in the same number of people.

Comparing the rural part of Surrey with Liverpool shows a greater contrast :

	Population.	Deaths in 1841.	
Surrey, rural.	229,733	4,256	or one in 57, average 45 years.
Liverpool,	223,434	7,556	“ “ 29, “ 26 “

A comparison of the country with the city, as to the causes of death, leads to the same results. I have not time now to make a new analysis, which shall include the experience of England down to my latest reports (1857); but I have here an analysis of four years which I made ten years ago, and I doubt not the same results will be shown by an examination of the subsequent years.

CAUSES OF DEATH.	25 CITIES AND TOWNS.		12 RURAL COUNTIES.	
	POPULATION IN 1841.			
	3,759,186.		3,440,501.	
	To square mile, 5,108.		To square mile, 199.	
	Average Deaths per year to 1,000,000 living.			
All Causes	27,073		19,300	
Zymotics	}	6,013	3,422	
Epidemics				
Endemics, etc.....				
Nervous				
Respiratory	4,257		2,256	
Digestive	7,967		5,327	
Old Age.....	1,972		1,042	
Small-pox.....	1,943		2,676	
Measles	1,045		507	
Scarlet Fever	914		364	
Whooping Cough.....	988		478	
Croup	829		415	
Diarrhœa	268		201	
Dysentery	306		148	
Cholera	47		31	
Influenza	32		17	
Fever.....	50		94	
Erysipelas	1,266		1,006	
Dropsy	133		53	
Scrofula	914		913	
Sudden	52		101	
Cephalitis.....	288		250	
Dropsy of Brain.....	267		111	
Apoplexy	876		334	
Palsy	422		387	
Convulsions.....	367		353	
Lockjaw	2,000		852	
St. Vitus's Dance	11		7	
Epilepsy	2		1	
Insanity	87		73	
Delirium Tremens.....	31		23	
Quinsy	27		10	
Bronchitis, etc.....	54		22	
Pleurisy	229		112	
Hydro-Thorax.....	45		28	
Lung Fever.....	132		153	
Asthma	2,084		982	
Consumption.....	687		196	
Disease of Heart	4,463		3,660	
Teething	422		226	
Gastritis, etc.	616		120	
Mesenteric disease.....	660		366	
Worms	70		59	
	30		30	

TABLE. — *Continued.*

CAUSES OF DEATH.	25 CITIES AND TOWNS.	12 RURAL COUNTIES.
	POPULATION IN 1841.	
	3,759,186.	3,440,501.
	To square mile, 5,108.	To square mile, 199.
	Average Deaths per year to 1,000,000 living.	
Hernia	41	26
Colic, etc.....	41	54
Stomach disease.....	124	97
Liver disease.....	290	226
Disease of bladder	117	101
Childbirth.....	221	137
Disease of females	54	30
Rheumatism	72	48
Joints, disease of.....	95	56
Skin, disease of	36	28
Intemperance	19	7
Violence	827	698

We have not the records sufficiently complete as to this country to make the same comparison here, but so far as I am furnished with the facts, and have been able to compare, I am led to similar results in regard to the value of life and its dangers in the cities and rural districts of our own nation.

The remark of Mr. Jefferson, that cities were ulcers on the public body, is certainly true in respect to the vital force of a nation. Cities consume and waste more life than the country. There is more sickness and more early death, and consequently less longevity, among a dense than among a sparse population. This being the case, it is important for every city to be laid out in as near a resemblance to the country as possible, with wide, straight streets, with open squares and spaces, with everything that will admit as free a circulation of air and as full access of light, and prevent the concentration of animal life as much as possible.

Whatever is saved in narrow streets, density of population, and narrowness of dwelling, is lost and more than lost in vital force. Whenever and wherever a community packs itself together in

streets and houses of the smallest possible dimensions, covering the least area of ground, they diminish the amount of their own and their families' vitality. A larger proportion of the children born and raised there die, and a smaller proportion grow to manhood and womanhood. The men and women have less power to labor, to produce and make money, to enjoy life, to think, and to resist disease. The narrow street and the narrow house diminish the force of life, and shorten its duration.

I always think of this when I pass those streets which are built south of the Providence Railway Station, in Boston. I feel it when I go through some which are on the South Cove lands. I hope that now, when you are laying out the new extension west of the Common, you and your city and State governments will avoid these errors, and provide as largely as can be done in a city for the health, the vital energy, power of production and longevity of those who may dwell thereon hereafter.

This, of course, is to be modified by many existing circumstances, as difference of drainage, cleanliness, habits of people, etc.

Beside the English Reports on this subject, which I have mentioned, there are many others published by order of Parliament, on these topics, all of which should be in the State library and in the library of every city, so that our people may profit by the experience and the suffering of other nations, and especially of Great Britain, whose government is now giving so much of its time, authority and money to these sanitary investigations, and to find the means of preventing sickness and debility, the needless waste of strength, of productive and industrial force, and of life among its people.

Beside these, I commend to your consideration a valuable essay, by Noah Webster, *On the Proper and Healthy Construction of a City*, which is appended to the second volume of his *History of Epidemics*. If you care to look at it, and do not find it elsewhere, I shall be pleased to lend it to you.

I believe I have herein answered all your questions. If not, and you will again inform me, I will make another attempt.

Trusting that you will persuade the powers that be, and direct

them to lay out those lands in such a manner as will best insure the health and power of their future occupants, and of the rest of the city. I am, dear sir, very truly, your obedient servant,

EDWARD JARVIS.

DORCHESTER, Mass., 2d April, 1859.

GEO. H. SNELLING, Esq. :

Allow me to quote one or two more facts illustrative of the principles laid down in my former letter.

In two parishes in York, England, the "old buildings were taken down, the streets widened, and the population diminished." The mean age at death, which was 26.2 years in the five years ending 1821, before the change, increased to 36.6 years, the five years ending 1851, after the change, and the infant mortality diminished from 45.9 per cent in the former period to 30.4 per cent in the latter. — See *Review*, p. 436. See also *Health of Towns' Com. Report*.

In the rural districts of Ireland, the expectation of life at birth is thirty years ; while in the cities it is only twenty-four years.

	Of 100,000 born, there die,			
	In 10 years.	In 50 years.	In 70 years.	Average Longevity.
Surrey (rural part)	24,577	47,940	71,962	45
Liverpool.....	51,789	74,122	92,627	26

The rate of mortality and the average age are not stated in the report in the densest districts of London and Liverpool, which last facts I quoted in my letter.

It is not necessary to print the mathematical ratio of the mortality in different densities. Yet you wish to present the facts that show, and the principles that prove, that *decrease of life* goes in a positive ratio, hand in hand, with the increase of *density of population*.

Yours, very truly,

EDWARD JARVIS.

QUINCY, July 29, 1859.

GEORGE H. SNELLING, Esq. :

Dear Sir, — According to your request, I have signed the memorial to the legislature, soliciting a modification of the plan of building on the Back Bay lands. In doing it, I have deviated from a rule of conduct I had prescribed to myself. At my period of life, to take a lead in suggesting or advocating local city improvements I deem an assumption which I avoid. I have yielded to the obviousness of the vital importance to the future health and comfort of the inhabitants of the city, which your memorial so fully and ably illustrates and explains.

The prospects of Boston for future extent and population are magnificent. Massachusetts, although she has already, by voluntary self-sacrifice, deprived herself of by far the largest portion of her ancient territory, is yet, by her intellect and moral power, destined to be the leading influence in these Northern States. For this distinction she is largely, if not chiefly, indebted to the skill, wealth, and enterprise of the inhabitants of this city. I trust, therefore, and cannot doubt, that the legislature will realize that the permanent interests and prosperity of every part of the State are identified with patronizing improvements such as you suggest, apparently so essential to the future health and accommodation of the inhabitants of her capital.

With great respect, I am yours,

JOSIAH QUINCY.

BOSTON, February 9, 1860.

G. H. SNELLING, Esq. :

Dear Sir, — In reply to your note of yesterday, requesting my views upon the Back Bay question, I would say, that if any word of mine can be of service to you in your praiseworthy efforts to preserve from mutilation the original and natural features of that which gives to Boston her greatest charm, and constitutes her most valuable public property, — the Common, — I shall consider it not only a pleasure and a privilege, but a *duty* to give it. So

far as I have had opportunity for observing, there is in no city of the United States a park that can compare, in some most desirable features, with the Common of Boston. Other parks are usually surrounded on all sides by a dense population, and all the air that circulates in them must have passed over, and been contaminated more or less by, the exhalations of numerous human bodies, and accumulations of artificial filth. The Common of Boston is, on the contrary, like a great opening into the country. It is a section of the country coming up into the very heart of the city, — not an isolated section, but connected and communicating with the great expanse and body of nature (as a branch is connected with its parent tree), from which life and freshness constantly circulate through it. In it the citizen may inspire the fresh breeze, and commune with the spirit of rural nature. And, either by wise foresight and design, or else by a happy accident, the Common opens exactly on the right side of the city, — the southwest, from which point the winds usually come during the hottest and most unhealthy season of the year, when such free circulation of air is most needed. It is a great ventiduct, conveying pure air into the city as your aqueduct brings water. In short, it is a great windpipe, through which the city breathes; and the opening out into Back Bay is, as it were, the mouth of the city; and to obstruct it by buildings at the outlet would be a kind of public strangulation, and should never be permitted.

No part of the outlet of the Common should ever have been permitted to be built on; but now all should be saved which it is possible to save, — at least as much as your beautiful plan contemplates. And it is certainly to be hoped that the enlightened body of men who constitute the legislature of Massachusetts will not suffer the free ingress of pure air to the Common, and the wide view of nature, — of water and of the distant beautiful hills, and of the evening sun sinking behind them, which has hitherto been enjoyed from it, — to be obstructed and shut out by the Bay being filled up and built upon.

This is not a mere question of pleasure, or even of profit. It is a question of *justice*. It may do for the rich, and for the sons and daughters of the rich, who, when health, comfort, and pleasure

shall bid, can escape from the city and visit the distant mountains, or sojourn by the sea, or go when they will and return when they will. But for those who depend upon daily labor for support, and who constitute the great majority of the population, there is no such escape. Necessity holds them prisoners in the city and in their confined habitations through the long, hot, and unhealthy summer, as well as all other seasons. It is *these* that most need the protection of law. Suffer not to be shut out from them the freest inflowings of the life-giving, health-preserving breath of heaven.

It is only by communion with nature that the heart of man can be properly educated. By looking upon the great works of God in nature, the soul is incited to lofty aspirations, — is raised to greatness. But if the work is suffered to be consummated, how many thousands and hundreds of thousands of children in all coming generations, who, through narrow circumstances are confined to the city, will pass their existence shut out from these ennobling influences of nature! How many children shall be born and die, to whom the glories of a setting sun shall have been a forbidden sight? Surely, it is not for a Christian community and an enlightened legislature, to suffer considerations of gain thus to imprison the souls or to obstruct the free breath, or in any manner or degree to diminish the health and happiness of the millions who, in the probabilities of nature, are hereafter to pass their lives in this city.

Very respectfully,

E. Y. ROBBINS.

Boston, March 1, 1860.

Mr. G. H. SNELLING :

My Dear Sir, — I understand that your Back Bay memorial is to have a hearing before the committee to-morrow. I do not know what the prospect is. I do not know what questions there are about titles, claims, and public interests, or how they are complicated with engagements or bargains already made. But one thing I do know, which is, that when that wall of houses is built along Arlington street, it will cut off the loveliest view of land and

water and distant horizon that ever was opened into the heart of any great city that I have ever seen, except Naples. The parks in London, the Central Park in New York, offer nothing of the kind. This view, kept open, would bring the country into the city, and blend them together in a manner as rare as it would be delightful. We do not see this, but strangers do; and I, perhaps, am more impressed with it, because Boston is less familiar to me. We do not know what we are losing, and shall not, perhaps, till it is lost beyond recovery.

The *health* consideration, I am persuaded, is a great one. I have watched the vane from my chamber window for the last four months, and I believe that I am entirely within bounds when I say, that twenty-seven days out of thirty it has pointed to the southwest. The Back Bay and the Common are now a grand tunnel to let the fresh breezes of the country into the city. How it will be when that avenue is choked up, future generations will have time to lament; but there will be no remedy.

But, whatever the decision shall be, you at least, my dear sir, will have the comfort of reflecting that you have done what you could. Wishing that I could as hopefully, as I do earnestly, desire success for your public spirited efforts,

I am, with sincere regard, yours truly,

ORVILLE DEWEY.

GEO. H. SNELLING, Esq., Boston:

Dear Sir, — Your favor of February 29th, asking my opinion on the hygienic influences of movements upon the Back Bay, so called, was duly received, and has been but hastily considered for lack of time.

The advantages which your plan presents to the future health and welfare of our city appear to me too obvious to need much argument.

The great subject of public health, and the influences which affect, or the laws which regulate it, have received but small consideration among us. In England, the sanitary question is said by high authority to be *the* question of the day.

I do not think that the plan now being pursued in filling up the Back Bay would be tolerated in any English town, especially when the modification which you advocate presents the promise of such immense advantages for the benefit of all coming time.

Our American cities are negligent — notoriously so — in matters of health and physical comfort. Pecuniary interests are uppermost, and men seem disposed to add wealth at the expense of life. This is short-sighted. It is sinning on credit where there is no bankruptcy; but future generations must pay dearly for the improvident policy of the present.

But these are general statements. Specific facts tending to prove the incalculable benefit to the health and vital energy of our citizens, which would result from the adoption of the plan you propose in filling the Back Bay, might be drawn in large numbers, and of the most convincing character, from the many reports of the British Board of Health, which are before me.

But, without going abroad, let us look for a moment at lessons derivable from examining some sections of our city. For the sake of comparison, let us consider Wards Six and Seven, which occupy opposite sides of the city, in a middle section between its northern and southern extremes.

Ward Six lies on the western side of the city, and embraces that elevated portion between Cambridge, Temple, Mount Vernon, and Beacon streets, with Charles River for the remainder of its boundary. This section is well located by nature for drainage and comparatively pure air, having the Common contiguous on the south, and the water on the west. It includes the site of the State House, and covers the western slope of the hill on which the capitol is so conspicuous. This region is inhabited by many of our most opulent, as well as many of our more indigent citizens. More than one-half of all the colored population of our city dwell in Ward Six. The population of this ward is shown by the census of 1855 to be 11,597; and the deaths during 1855 were one hundred and sixty-seven, being a little less than *one in seventy* (69.4) of the population. This is 1.44 per cent, and proved to be the most healthy ward in the city during the period of observation.

Ward Seven lies on the easterly side of the middle portion of

the city, and is bounded by a line running from Central Wharf up Milk street to Washington, thence to Winter, through that to Tremont, thence to West, and down through West and Bedford streets in nearly a straight direction to the water of the harbor at the foot of Summer street, having the shore for the remainder of its boundary. This embraces Fort Hill, the whole of Broad street, Federal street, etc., localities well known for their insalubrity. It also contains some first-class residences in the vicinity of Summer, Bedford, and Washington streets, and between Winter and West streets. But a large portion of its territory is densely peopled, badly drained, low, and filthy. Its population consists of 18,430, only twenty-two of whom are colored. The deaths during the twelvemonth were five hundred and five, which is *one in thirty-six and a half*, or 2.74 per cent of its population, being in comparison with the mortality of ward six as TWENTY-THREE TO TWELVE. Thus, as will be seen at a glance, ward *seven* exhibits nearly twice the mortality that ward six does. Had the proportion of deaths to the living been as low in ward *seven* as it was in ward *six*, there would have been only two hundred and sixty-five deaths during the twelvemonth, which would have been a saving of no less than two hundred and forty lives in that single ward during one brief year. This would have been no less than 1,200 lives saved at the same rate during the past five years. Who can say that this might not have been done by proper sanitary regulations, which are specifically under the power of the government. Are not the protection and preservation of life as much the subjects of municipal regard as the protection of property? It is made so in other countries, at least.

The foregoing is extracted from my report on the census of Boston in 1855, made to the city government.

Many of the advantages to health now enjoyed in ward six are due to the free exposure to pure air from the water, and many of the destructive influences in ward seven are due to the absence of the same.

The entire enclosure of the Back Bay will tend to produce the conditions, in this particular, now inflicted on ward seven, and the

modification proposed by you will tend in a great measure to secure the advantages in this particular now enjoyed by ward six.

The subject might be pursued, but time forbids. I sincerely hope, in behalf of posterity, that a fatal error, now easily avoided, but, once committed, irreparable, will not be committed by those to whose wisdom and discretion such weighty interests are intrusted. I trust, sir, that the authorities of the Commonwealth will act wisely in relation to the welfare of the metropolis, and exercise a practical, operative belief in the sentiment of an eminent foreign writer and divine, who says, — “ The facts of sanitary science are at once so notorious and so easy of comprehension that ignorance in an educated man must be either wilful and deliberate, or the consequence of a stupidity which ought to unfit a man for any office or responsibility.” *

I am, sir, yours very truly,

SUFFOLK PLACE, BOSTON,

JOSIAH CURTIS.

March 2, 1860.

BOSTON, March 2, 1860.

MR. SNELLING :

Dear Sir,— Agreeing with you in your opinion as to the necessity of a wider central opening in the building over of the Back Bay, I regret that I cannot second you with influence and ability equal to the strength of my conviction that this closing up of the city on one side will compromise the health of its present and future inhabitants, and that the modification you propose would greatly lessen the evil.

A large basin of water on the west, renewed from the ocean at every tide, would purify the atmosphere and tend to equalize the temperature in summer and winter. It would, by increasing the tidal flow, facilitate the drainage of this section of the city, and in some degree compensate for the injury which has been done to the channel of our harbor by encroachments upon its marginal waters, and the driving of numerous bridge piles in the bed of Mystic and

* Rev. Charles Kingsley.

Charles Rivers. It would, moreover, unquestionably so much enhance the value of lots in its neighborhood as to render the whole receipts from the Back Bay lands much greater than they could otherwise be.

In every city of the world, where an extensive water front, unappropriated to business purposes, exists, it will be found to be occupied by the wealthiest inhabitants. The most valuable land for residences is to be found, at St. Petersburg, on the banks of the Neva; at Hamburg, on the Jungfernstieg and Allsterdam; at Dresden, on the Terasse; at Frankfort, on the Schöne Aussicht; at Florence, along the Arno; at Naples, on the Chiaja; and in this country, at Charleston on the Battery, and at Chicago on Michigan avenue.

You desire me to repeat to you some remarks at an informal meeting on this subject.

Some thirteen years ago, at Frankfort on the Maine, a city occupying a very small area, compactly built and densely populated, I was attracted by a broad open space, nearly encircling the city, laid out as a garden, and used as a public promenade. Dr. Schott, an eminent physician of the place, said to me, that although this ground was of great advantage for recreation and exercise, he conceived that it was desirable chiefly as a ventilator for the narrow, high-built streets and lanes of the city; that formerly this space was occupied by walls for defence; that formerly Frankfort had been noted for the prevalence of scrofulous diseases, and a great number of cripples and rickety persons; but that in the lapse of one generation after the removal of the ramparts, the physical characteristics of the population had changed, and the cripples had disappeared.

It has, I believe, been lately decreed by the Austrian government that the walls around Vienna shall be levelled. This city has long been surrounded and separated from its suburbs by spacious pleasure-grounds, and probably the chief, if not the sole object of this levelling, is to allow a freer circulation of air through the narrow limits of the city proper.

Hoping that in this respect we shall be not less intelligent and provident than the cities of Europe, and that our western boundary

will not be walled up without adequate provision for ventilation from the quarter whence, in this climate, it is most needed,

I am, very truly and respectfully yours,

JOHN H. DIX.

SENATE CHAMBER, March 26, 1860.

My Dear Sir: — I am grateful for your timely intervention to save our Boston Common, by keeping it open to the western breezes and to the setting sun. It is not pleasant, I know, to separate, in opinion, from those about us; but your object is so disinterested, so pure, so benevolent, so truly in the nature of a charity, that all, even though differing from you in details, must be glad that you have come forward.

I know well the value of water in scenery. Perhaps nothing else adds so much to the effect of a landscape, which, indeed, without water often seems lifeless; or, as was once said by a valued friend of mine, “like a face without eyes.” Boston, from its peninsular situation, cannot be deprived entirely of this picturesque accessory. It seems to me, however, that in a region like that now in question, we should hesitate long before renouncing the opportunity of adding to its attractions by a piece of water, which, from perennial supply, would always prove, and might become, an ornament of unsurpassed beauty, if not also a place of recreation, and a source of health.

On this matter it would be useless for me to enlarge. All who have ever stood on Boston Common will see at once how much this pleasant retreat will lose in charm when its great western gate is closed; and all who have ever speculated on the probable growth of our metropolis, and the longing of a crowded population for fresh air, will recognize the necessity for open spaces, which will be *out-of-door ventilators*.

Boston is already growing in every direction. A wise forecast, if not able at once to provide all the means needful for its salubrity and adornment, will at least avoid embarrassing the future, when half a million of souls will build their houses in and about the ancient Trimountain.

Our Common has been ample enough for the past; but the metropolis has already outgrown it in every respect. Besides being too narrow in proportions, it is wanting in those accessories of beauty and of science, especially illustrative of natural history, which, according to the experience of other countries, are proper for public grounds. I wish much to see there, among other things, an arboretum, where every tree, that will bear our climate, shall find its classified place, — pleasing the eye by its beauty, protecting the body by its shade, and speaking to all by the voice of science.

Accept the thanks of an absent citizen, who never thinks of his native Boston without a yearning to see it foremost in all that makes a true civilization; and believe me to be, my dear sir, very faithfully yours,

CHARLES SUMNER.

To GEORGE H. SNELLING, Esq.

Boston, April 2, 1860.

GEO. H. SNELLING, Esq.:—

Dear Sir,—In answer to your note of the 31st ult., I reply that, in my opinion, there are no practical difficulties to be apprehended in the modification proposed by you in the plan for filling the marshes at the bottom of the Common.

.
Should the views taken by yourself and so many of your fellow-citizens prove ultimately erroneous, the remedy is easy. The section may be filled in.

If, on the other hand, the “Back Bay” should prove to be no exception to the general rule, and, for want of a free circulation of air, become like the Mill Pond and South Cove lands, the remedy would be excessively expensive, if not impossible.

It may be said the proposed streets are unusually wide, and, in consequence of this, the difficulty would be obviated. In answer to this it may be said, that there are no data upon which to base such a conclusion. It is an experiment. Is it not wise, when we are making an experiment, to so proceed that we can retrace the ground we may lose, and be in a position to correct, rather than

to go on with, a plan which, if it is wrong, must remain so, however injurious it may be to all interests?

I would write more at length, did time permit me, upon this point: as to the probable insufficiency of the width of the proposed streets, liberal in width as they at first glance appear to be. The time required to do justice to the whole subject is not now at my command.

The propriety of a wide avenue at the point indicated in your memorial is conceded by the projectors of the plan. The buildings recently erected show that the width, liberal as it was supposed to be by those gentlemen, is entirely inadequate, and indicates very clearly that, if the proposed plan is carried out, the Common will be greatly injured.

The area of the Common is small as compared with the reservations of land in other cities for like purposes. Its position has, up to this time, compensated for this deficiency by the extensive view beyond. The projected improvements have already gone far enough to show the effect they will have practically upon that important appanage to the city.

The State has always been liberal in alienating the public domain, in making reservation for public purposes.

The daily toil of the inhabitants of Boston alone will give value to this domain. It has no intrinsic value except position. It appears to me that they have a first right to claim such a reservation as you have proposed; and still more strongly, that the advantages they now have for "light and air" shall not be sacrificed to the desire of gain by any party.

If they labor to give value to this land, they are entitled to so much as is requisite to their well-being and comfort. To refuse it is like "muzzling the ox that treadeth out the corn."

But there is another view of the matter which may be taken, where it seems probable that this concession asked in your memorial will be attended with no loss to the State or other parties interested. This district, if improved at all, must be used for dwellings. It cannot compete in price with the marsh lands in Cambridge, Chelsea and East Boston, if required for other purposes.

There is no inducement to build upon this district, other than the great advantages of light, air, and distant prospect beyond. And it has been already seen, that, where these advantages are supposed to exist, a good price can be obtained. It is, therefore, in my judgment, of the last importance, that the value of this district should not depend upon the result of a judgment which may be wrong. It would be far better to give up this section, as proposed by you, than to have the whole reduced in price, if the prospect should be obstructed, as I think it will be, when the length of the avenue begins to be developed, — as length has an important bearing when applied to perspective proportions.

I feel quite confident that if the most liberal allowance is not made in this respect, the filling will be a failure ; judging from instances elsewhere, it will be so at any rate.

This, of itself, would be a great misfortune ; but if to this should be added the injury or ruin of that we now have, — to wit, the Common, — the result would be as mortifying as disastrous.

The general principles affecting this matter are so ably set forth in your memorial, that there is nothing left to be done, except to go into the matter of details, which at this time cannot be done.

I therefore proceed to notice more especially the subject of drainage through this basin to the water beyond the dam.

There can be no difficulty in doing this. The drain can be as easily and cheaply made across this basin as across the same length filled with earth.

It appears to me that this objection is rather a sudden suggestion than a deliberate opinion. The real difficulties which will be experienced in draining this district must all be met and overcome before this point is reached. Whoever solves that problem will find no difficulty in crossing this space.

I have briefly answered your note, and wish that the time and ability were mine to show to those having charge of this matter the thing in its true character ; but where the only rule of conduct is gain, and where selfishness and cupidity rule, I long ago learned that nothing could be done, and persons so controlled were not accessible by argument or facts.

In this case, however, it does appear to me, that, on the dollar

principle, an error will be committed if your plan is not adopted ; and, on the other hand, no dollar can be lost if it is adopted ; because it proposes simply not to expend the money now.

Will it cost more to fill it hereafter? I think not, as the track can easily be brought so as to lead lengthwise of the whole section, and there will be as little changing of track, perhaps less than now. The difference can be but slight if any ; and against this is to be set off the interest of the money which is expended between the time of expenditure and the sale of the land.

Please accept my thanks, as one citizen of Boston, for all you have done in our behalf.

Your obedient servant,

WM. P. PARROTT.

The following letters should have been printed as a note to Dr. Holmes's testimony :

CAMBRIDGE, Nov. 6th, 1869.

My Dear Doctor: You are a poet and a physician, therefore equally awake to the beautiful and the healthful. It is on that double account I am induced to write a few lines to you. For now more than twenty years I have been admiring and enjoying the sight of Boston by day and by night, while crossing our bridge. Few cities are blessed with such an approach. I have again and again contrasted it with other favored localities, and never ceased to congratulate myself and my neighbors upon our opportunities. And what shall I say of the salubrious influence of such a large sheet of sea water, bathing, invigorating and refreshing its surroundings? Is it possible that there are men so entirely ignorant of the value of such natural advantages, or so insensible to the sanitary condition of their fellow-citizens, as seriously to propose to mire this spring of health, comfort and enjoyment? I hope such vandalism will not be tolerated, and you will find in Cambridge a host of radical friends ready to be extreme conservatives in this matter.

Ever truly yours,

L. AGASSIZ.

Dr. O. W. HOLMES, Boston.

SATURDAY, NOV. 6.

My Dear Sir: I see that you are strongly opposing the plan of taking away from us the broad expanse of water in the rear of the city, and leaving in its place a channel of only a few hundred feet. It seems to me impolitic on many accounts, but I object to it particularly on the score of comfort and health. I shall never forget the year that I passed at the Massachusetts General Hospital, when I was a medical student, and how delightfully cool and refreshing the breezes were, as they came over the water, which then almost washed the foundations of the building, the heat at such times up in the city being often perfectly oppressive; and the same luxury I have often enjoyed since then in the upper rooms of the Medical College, which look out towards the water. Trusting that you will effectually put down this scheme, and convince those who favor it of its impolicy, I remain,

Yours sincerely,

J. B. S. JACKSON.

Dr. O. W. HOLMES.

218 TREMONT STREET, Monday.

My Dear Sir: Your note of Saturday, addressed to my brother, asking for information about the Binnen Alster in Hamburg, is just received. In reply, I beg to state, that the Binnen Alster is not only an ornament and source of comfort and health to the city of Hamburg, but it has been the starting point of making it one of the most beautiful cities of Germany, if not of Europe. . . . I believe the citizens of Hamburg would as soon think of burning up their city as of filling up their Binnen Alster, and I should think our citizens would as soon see cows turned into the Common as to part with the beautiful sheet of water on our Charles River.

Faithfully yours,

SEBASTIAN B. SCHLESINGER.

Dr. O. W. HOLMES.

PROVIDENCE, Nov. 6, 1869.

Dear Uncle: My answer to your note is unavoidably written in haste. The basin in the centre of Providence was originally a Cove of mingled salt and fresh water and mud, into which two small rivers ran, and from which one flowed out, going by Weybosset point, where the great bridge is built, and thence down to the harbor. This Cove and the river have been gradually encroached upon. . . . Dr. Snow, who is a first-rate sanitarian, gives his views of the probable effects of filling up the Cove, towards the last part of his report. But it needs no authority to tell us what must be the good of a central expanse of water, open to the purifying influence of sunshine, swept over freely by breezes direct from the hills, and daily stirred like the pool of Bethesda by the health-bringing angel of the tide. I fear that we have not enough public spirit to keep our natural advantages, and hinder this river from degenerating into a cloaca. If things go on as I fear, it will be a triumph of trade over the best good of the city, deeply to be regretted in future years. All high and far reaching considerations—regard for health, beauty, man as compared with present gain of money—go against the projects which are now obscurely intimated. We look to Boston's example, as you will see by the enclosed from our Journal of a few days ago.

CHARLES W. PARSONS.

[*Extract from Report upon the Sanitary Effects of filling the Cove basin in the City of Providence, by EDWIN M. STONE, M. D., p. 10.*]

The conclusions in relation to the whole subject, to which I am forced, and of which I have not the least doubt, are briefly as follows:

1. The filling up of the Cove basin as proposed would prove a great, immediate, and permanent injury to the public health of the city of Providence.
2. It would prove the complete destruction, for purposes of navigation, of the harbor from Weybosset bridge to Fox point.

3. It would put the property in a considerable portion of the city into imminent and constant danger from freshets and southerly gales.

4. It would destroy one of the greatest and most attractive ornaments that the city contains.

Such would be the certain effects of filling the Cove basin as is proposed, while the contraction of its limits to any extent whatever would produce precisely similar results, and to an extent in exact proportion to the extent of the contraction.

I sincerely trust, then, that the Cove will not be filled up ; that its present limits will not be contracted ; and that thus a great calamity to the health, to the prosperity, and to the beauty of our city may be avoided.

EDWIN M. STONE, M. D.;

Superintendent of Health.

PROVIDENCE, Dec. 24, 1867.

The committee then listened to the final arguments of the counsel for the various remonstrants.

MR. INGALLS. Mr. Chairman and Gentlemen of the Committee : I am not presumptuous enough to think that I can teach this committee much about this subject ; but perhaps I can aid you somewhat in your deliberations by calling to your minds some of the material portions of the testimony. You are sitting here somewhat in the nature of a court of equity, to hear the facts in regard to this case, and to apply them as you understand the law. And as it is the duty of counsel before the courts to recall the evidence to the minds of the court, and state the law, so it is the duty of counsel appearing before you here, to aid you, so far as may be, in arriving at a thorough understanding of the evidence which has been presented before you ; always bearing in mind that the court is far better able to appreciate the general principles of the evidence adduced, while as to particular facts it may desire aid.

There is one difference between your committee and a court,

and that is, that no court of this Commonwealth ever was called upon to consider a matter of such importance as this in respect to its pecuniary results, and one so pregnant with injury to thousands now and thousands to come. And I may, therefore, be pardoned, perhaps, for trespassing upon your time somewhat in calling your attention to a few of the important facts which have been presented here, whether by counsel or by witnesses.

The proposal which is made here is to change the estuary of the Charles River from its present line. The line of that river as it exists upon the Beacon street side, where the proposed filling is to be made, was fixed by the act of 1840, chap. 35, which has been cited to the committee in the opening argument of Mr. Shattuck. I wish simply to call the attention of the committee to a clause which has been brought to my notice since the act was cited before you; and I wish to state to the committee that the effect of the act, as it seems to me, — and I think the committee will agree with me, — is, that no pier or structure beyond this harbor line should ever be built, neither could any pier or structure be extended to it, unless by permission of the legislature. The permission of the legislature clearly, as you will see by reading the act, refers to the piers and structures already in existence within the harbor line. The word “nor” is used, and the punctuation shows that such was the intent of the act. And I think that every member of the committee, looking at the wording of the act, will agree with me in this view.

I do not propose to take the position before the committee that the legislature cannot alter and modify the act. I think the substance and effect of the act is this: that the legislature may alter and change that line for several reasons; that they may alter and change it whenever the public health demands it; that they may alter it if the public necessities demand it; that they may alter it if the interests of the harbor or the commerce of Boston demand it; always bearing in mind that if they change that line, then they are to compensate everybody who may be

injured thereby; and this must be a full and complete reparation to every man, no matter how remote that injury may be.

When this committee was appointed to report to the next legislature, and a meeting was called in reference to the filling of Charles River, the very fact that legislation was proposed, affecting so large an amount of property, naturally suggested the question of, What great overriding necessity called for this filling; whether the health of Boston, or public necessity, or the interest of the harbor and commerce of Boston?

Now, it is a well-known principle in law, and I think it has always been laid down as a rule by the legislature, that where a legislative measure is sought for, its necessity must be shown, and he who desires a change must show the reasons for such a change. In this matter we appeared here, supposing that we should hear the reasons for making any changes in this harbor line; and that, nobody appearing to tell us what great exigency demanded this change, the committee might well stop there, and report that there was no proof that any necessity existed for the change proposed. But I suppose that the subject was so important that you wished to do your whole duty, and have therefore given us an opportunity of proving a negative, and for that purpose you assume that an affirmative case is already made out. The committee will bear in mind that, whatever mistakes we have made in putting in our case, we have been in the difficult position of proving a case to meet an assumed case, and to prove a negative when of the affirmative we knew nothing, nor of the reasons upon which it was based.

In order, therefore, to prove that this change is not demanded, we have produced evidence (1) that it would be an injury to the harbor of Boston; (2) that, financially, it would be a failure; (3) that it would greatly injure property for which compensation must be made, and (4) that in a sanitary point of view it would prove injurious to this city.

The first question is a matter entirely for experts. Some

of your committee, I have no doubt, are more competent to judge upon that matter than any of the counsel, and perhaps as competent as some of the experts; but what testimony they have produced before you is certainly useful, and has an important bearing on your proposed action. We have brought before you two of the best experts in these matters, Mr. Boschke and Mr. Pratt. In fact, they are about the only two men in Boston who are competent to give you an opinion in such a matter as this. Without going into the detail of their testimony, I will merely say that the general substance of it is, that this filling would prove injurious to the harbor, and that the least that can be said of it is that it is an experiment, and one that is fraught with danger and peril.

And at once the question comes home to the committee whether, in order to make an experiment, you are willing to put in peril the existence of Boston harbor and the vast interest of the commerce of Boston, without any testimony in favor of it, and without any reason shown to justify it, when the best experts in the country tell you it will be dangerous and injurious. I leave this without further comment. I think no committee of the legislature of Massachusetts will recommend undertaking such a work as that, against such testimony.

Secondly, the proposed change would be financially a failure. It has been rumored that the committee would recommend this filling for purposes of speculation. But I am happy to state that during this hearing I have heard no suggestion that would give color to any such intimation. And I do not think this committee, or any other committee of the legislature of this State, will so far forget their duty or the honor of this Commonwealth as to propose to speculate in property of this kind. It is property which is held in trust, and for certain limited purposes; and it would be as great a breach of trust for the legislature to speculate in property so held, as it would be for a trustee to speculate in the private property which he holds for another.

It will be useful to examine the financial results of this proposal, and to ascertain whether or not it will pay, in order that we may the better weigh other reasons for or against it. The financial results may be so bad that they will override the necessity, if there is any, for carrying it out. I understand that Mr. Derby has gone over this part of the case very carefully, and I leave the details of it to him. Sufficient is it that witnesses who have been before you, men who are competent to give an opinion upon such a matter, have told you that as individuals they would not take this basin and fill it up if you were to give it to them. Witness after witness has told you this. Mr. Hills, who is perhaps the most competent man there is to judge of the results of this proposed change in a financial view, says that he would not take this property as a gift, and be obliged to fill it up. If private individuals will not take this property as a gift, do you expect that the State is going to make anything by the operation? Do governments generally make anything where private individuals fail? I think there is but one undertaking in which this State is engaged (and has been for many years) which can properly be compared with this, and the financial results of that have certainly not been very gratifying. I refer to the Hoosac Tunnel, which is perhaps something of similar magnitude; and no man knows better than your chairman, or can tell you more correctly than he, what the financial results of that enterprise have been. And judging from the effect of the State going into a speculation of this kind, we can judge something of what the result would be of its going into a speculation in the Charles River which private individuals will not undertake.

This filling would injure other property of the city, and of the State, upon the borders of this river, property upon Charles and Brimmer and Beacon streets,—estates having a water front. There is property there the assessed valuation of which is nearly eight millions of dollars. Is there a gentleman upon

this committee who will not admit that, under the act of 1840, if you fill in to the extent of a thousand or fourteen hundred or fifteen hundred feet, and put upon it buildings of no matter what kind, it will be an injury to these houses? And if you do it, under that act of 1840, you have got to make full and complete compensation.

Now, what is the testimony as to the damages which will accrue? Of course we cannot have positive evidence on this point, as it must naturally be in a great measure speculative. But what is the testimony of men who are certainly qualified to judge to a certain extent of the financial results to be expected? And we have produced before you, as I say, the best men in Boston; none of them put the damages at less than twenty-five per cent of the present value. Some of them go as high as fifty per cent. Call it twenty-five or thirty per cent, and you have got damages to pay, to start with, of two million dollars. These witnesses tell you further, that the damages in a sliding scale would extend further than Beacon street. And there is an amount which is incalculable of damages which you must pay, if you are going to give full and complete compensation to every man who has acted on the faith of the establishment of the line of 1840.

Then the testimony before you is, that the filling would cost substantially five million dollars before you can get back a single dollar. Because you must go on and build a sea-wall before you can fill in, and before you can sell the land. You have got to spend five millions besides the interest; you have got to pay the damages in Beacon street, and also in other localities; and before you can use this land, you must incur an expense of two millions for damages in Beacon and Brimmer streets alone. There will not be a demand for this land at once, and you have therefore got to keep an interest account during all that time; and your five millions will be doubled and trebled before you get any returns.

Now, are you, as men of judgment, who are appointed in a quasi-judicial capacity, willing to report and advise the State to go into an undertaking of this kind with these facts before you? That is the only question for the committee to consider.

There is another matter to which I wish briefly to call your attention, and that is, that this proposal will prove injurious to the city of Boston and the adjacent localities as a sanitary measure. The basin should be reserved as an open space for air and ventilation. This matter, Mr. Chairman and gentlemen, of breathing spaces for cities is no new thing. Years ago, in the early settlement of Boston, the Common was reserved and left as an open space for ventilation. The Public Garden was also reserved for the same purpose. And when the temptation was held out to the citizens to sell the property in the Public Garden and pay their public debt, they refused the bribe. In 1859-60-61, Mr. Snelling argued in favor of keeping open a space on the Back Bay out as far as to Brookline; and he brought in favor of that, letters from some of the most eminent men in the country, and from eminent surgeons, some of which have been put in evidence, and all of which are collected in a pamphlet that I shall leave with the committee. It contains the opinions of the best medical men of that time, that it would be injurious to occupy it. I am sorry to say that Mr. Snelling's project was not taken into consideration with much favor by the legislature. In 1861, however, his project in a modified form was carried through the legislature. Chapter 87 of the Acts of 1861 shows the result of Mr. Snelling's labor in a modified form; and by it the legislature adopted this policy of reserving open spaces in the city. It is true that the public commissioners have never carried it out to the extent that was intended, as they could not get all the necessary parties to agree to it.

Now, in 1866, the legislature by an act in relation to this same Charles River carried out this theory, that there should be reserved an open space, and also impliedly recognizing the line of

1840; because by that act of 1866 that provided that it should only be filled by contract with the riparian owners, and that in no case should it be occupied by buildings. That is, they might make an esplanade or promenade there, but it should never be occupied by buildings, upon any condition. From the first settlement of Boston to the present time, it has been the settled policy of Boston to reserve these spaces. From 1855, the time it was first brought to the attention of the legislature of this Commonwealth, down to the present time, it has been the steady and uniform policy of the State to preserve these localities for air and ventilation. I might go into the history of other places in this respect, but I have not the time; and you yourselves know better about it than I do.

Now, the experience of the past, all agree to be in favor of open spaces for health. The opinions of medical experts in the past all agree. The policy of the city and of the Commonwealth, up to the present time, has been in favor of them.

Then the question comes, whether, with the progress of science in the last ten years, medical experts have changed their opinion upon this matter? And we have shown you by some of the most eminent surgeons and physicians in Massachusetts, that their opinion is the same. They tell you that unquestionably this would be injurious as a sanitary measure, and that it ought not to be done. We might have gone on day after day and produced medical experts, until we had called all the physicians in the city, and nine-tenths, if not ninety-nine one-hundredths of them, would have told you that this was a matter full of danger, and which ought not to be carried out.

In this pamphlet of Mr. Snelling's to which I have referred, there is a letter from the Hon. John A. Andrew, and there is also a letter from the Hon. Charles Sumner, which is certainly authority in Massachusetts to some extent; and both of these letters are quite pertinent. Mr. Sumner says: "I know well the value of water in scenery. Perhaps nothing else adds so much to the

effect of a landscape, which, indeed, without water, often seems lifeless; or, as was once said by a valued friend of mine, 'like a face without eyes.' Boston, from its peninsular situation, cannot be deprived entirely of this picturesque scenery." Alas! that in less than ten years, a way has been devised to destroy that which Mr. Sumner thought in 1860 could not be destroyed. And truly, if you degrade this noble basin of the Charles River to a narrow, dirty sewer of five hundred feet wide, then will Boston look like a face without eyes. I trust this committee will not be the vandals to thus mar her fair proportions.

I wish also to read the letter from Governor Andrew in regard to this very thing. Mr. Apthorp gave you some idea of what Mr. Andrew's opinions were upon this subject in his testimony. And it is certainly of some use for the committee to know the opinion of a man who had such an opportunity for information, and who so fully enjoyed your confidence while living. It was written to a member of the city government in regard to filling up beyond Beacon and Charles streets, and laying the land out as a public promenade. He says as follows: "I hope sincerely that the city will save this little glimpse of country, this wealth of pure air, this fan-full of the westerly breeze, and secure a lasting good for all who value either health or beauty; while the present fathers of the city win also for themselves blessings on their heads from a countless posterity, until summer heats shall be no more."

Now, sir, as I have stated, the testimony before you to-day is that this is a measure which will be injurious. You talk about compensation for changing this harbor line. You may perhaps compensate the owners upon Beacon street for marring their beautiful residences; you may perhaps give them more gold, and swell still more their coffers, which are already overflowing; but who will estimate the damages which will come to the crowded denizens of this hill, and the crowded laborers of the North end, who by this means will lose their best reliance for

air and ventilation? Who is to estimate the damage to them of to-day and the thousands yet to come? It is a very serious matter. Because if you proceed with this work, if you provide for this filling, it is a deed which can never be undone; it must remain there for all time. The evil, if it is there, will remain, like the festering sore, growing worse each day, and with no hope of removal by the surgeon's knife.

And in going into a matter of this kind, with the opinions of the best physicians and surgeons, and the opinions of eminent men, and the opinions of experts, all against it, I trust that the committee will carefully consider it before they propose such a measure. And I trust that you will propose such a measure as shall settle this controversy forever, and such a one as shall provide that this space shall remain open for all time, for air, and for ventilation, and for beauty; and thus win for yourselves the blessings which Governor Andrew predicted for the city fathers, — the thanks of "all who value either health or beauty," and the lasting good-will of a countless posterity, "until summer heats shall be no more." If you make such a report as shall end this question and settle it, and preserve this area to Boston, then you will have done a good deed which will remain after you are gone. If hereafter there should be a question of sewerage, as has been alluded to, then when the time comes, there will be, I doubt not, a way found to dispose of it. "Sufficient unto the day is the evil thereof." We are only looking to the present, and when the future evil comes, then we can provide for it.

Mr. HILL. The municipal authorities of Boston, Mr. Chairman and gentlemen, cannot view without anxiety any proposals to reduce still farther the great tidal basins of Boston harbor. The temptation in a place where land is so dear to procure it by shutting out the sea is very great, and in times past has been yielded to in no sparing manner. Whether in so doing we or our ancestors have been wise is now only interesting so far as it teaches us what to do in the future. What has been done

cannot be undone. That we have thus acted hitherto with comparative impunity is very slight proof that we can hereafter continue the same action with safety. Certain it is that the subject of tidal harbors has only within a few years attracted the attention of scientific men, but within these years much has been learnt upon it, and enough is well known to make us pause before we make any further experiments in the shape of improvements on nature. The condition of our harbor is not so good as to relieve us entirely from anxieties in regard to the future, or to make us feel certain that the highest wisdom has governed in the encroachments which have been made upon it in the past; and the municipal corporation justly feels that its preservation is a duty which eminently belongs to those who are intrusted with the administration of city affairs.

This is one reason, therefore, of my presence at this hearing, and of my asking your permission to submit a few remarks to you to-day. The other reason is hardly less pressing. The extensive water area which surrounds this city has, in our opinion, had a most beneficial influence on its general sanitary condition, and now, with a population of a quarter of a million within the corporate limits, and of a hundred and fifty thousand more in the immediate suburbs, we are approaching that size which necessitates special foresight to enable us to preserve the same degree of health among this great multitude which has generally prevailed, without the need of any particular precaution, while the population of our city was much smaller. And the corporation of Boston is not yet convinced that the cooling influence of the sea water, washing around the margin of the city, can be dispensed with without danger to the health of the inhabitants, or that any benefit which we may derive from it can be easily supplied from other sources. We therefore are not yet ready to consent to have that water area reduced in any substantial degree, because we fear the effect upon the health of the city.

These are the reasons why the city of Boston is interested in

any report which your honorable committee may make, and as an injury done in either respect by filling in more of the tidal basins of the harbor will be remediless, we must oppose any such proposition so long as the consequences are in the least doubtful.

It does not fall within my province to say anything in respect of the particular rights of property which those living along the border of Charles River may have to the present open basin. They are represented here by able counsel, who have presented their claims in a manner which requires no additional argument. But there are interests outside of and beyond these, and that throw their importance entirely into the shade, which may perhaps in some respects be better advocated by the city government than by those gentlemen who have a deep personal interest in your action.

To one subject which has been constantly referred to in the course of this hearing, I ought, perhaps, to allude, and that is to the present sewerage of the city. I think, Mr. Chairman, that this may be left entirely out of your inquiries. As I have already ventured to say, I now repeat, that I have no doubt that if the present sewerage system, by emptying into Charles River, is injurious to the harbor, or to the public health, or if it should ever become so in future times, something will be done to remedy it. This can be effected in a great many ways besides filling in the Charles River basin, and until it has been proved that by that means only can any existing or prospective evil be corrected, we should be loath to admit the necessity of so violent a remedy. No notice has been given us of your intention to investigate the subject, and it is one which cannot be properly investigated without elaborate preparation; and it would be far better to leave it until we know more than we now can of the results of experiments which have been made in other cities, particularly in London. The sewerage necessities of the city do not, therefore, in my opinion, justly fall within the subject of this hearing.

The first question then is, whether an extensive filling along Charles River will injure the harbor? I know that this is a subject upon which there is a great difference of opinion, and I cannot be unmindful of the fact that the chairman of this committee, who has paid great attention to these subjects, and whose judgment is entitled to high consideration, differs from many of our witnesses, and from the conclusions which we draw from their evidence. Still I contend that the weight of scientific authority and of past experience sustains us in asserting that further encroachments upon the harbor are in the highest degree dangerous, and should therefore not be attempted.

Your attention has been called to the fact that the harbor of Boston is in many respects peculiar. One of these is, that no large river empties into it, as the Hudson empties into New York Bay, and gives the aid of its rapid current to the scouring force of the tidal water. For this we are almost entirely dependent upon the water which fills the basins behind the harbor, still remaining, and of which shortsighted cupidity has not yet deprived us. The existence and necessity of this force to prevent the channel gradually filling up is generally admitted, but it has been suggested that reducing the width of the river and deepening the channel, instead of lessening, will increase this force, and thus will improve the harbor rather than injure it.

The answer to this suggestion will be found in the testimony of Mr. Boschke and Mr. Pratt, who were examined at length before you. One or two reasons I shall allude to. In a deep, narrow channel, never empty, the water would flow in at each tide in a very different manner from what it would in a wide and shallow, and, at low tides, empty basin. Its current would be steady and uniform, and it would meet with little resistance; but it would lack that force which is derived from shallow, turbulent water. Our experience does not teach us that *cæteris paribus* deep water is so turbulent as shallow water. With our present basin, the tidal water flows in over large uneven marshes;

and in flowing out the current is similar to the currents of what are known as "rapids" in rivers, where the water is shallow, and where there is a slight declivity in the surface, as there is in the Charles River on each side of the channel; and this shallowness and declivity give an impetus to the water, which it imparts to the deeper water of the harbor, and causes the current to be much stronger and swifter than it otherwise would be as it rushes towards the sea. The force thus derived from the declivity in the surface of the basin is lost if the basin is never empty, or is so full as to bring the deep water on the same level with the shallow water. It is not necessary to point to the rapids of the St. Lawrence as an example of this principle. Every boy who has fished along the streams of New England has noticed it, and understands the fact of its existence perfectly well.

I contend, therefore, that if an equal quantity of water came in with the tide, its scouring force would be much less if it were confined within a deep narrow canal than it is in the present great harbor basin. But there is another danger to be guarded against: less water would flow in, and the force of the current would be proportionately reduced. The rise of the tide in a river or basin depends upon the demand or space there is for the tidal water. Thus frequently the farther up a river we go, the higher the tide rises. At London bridge, the tide rises four or five feet higher than at the Nore, sixty miles farther down; and removing the narrow arches of old London bridge, forty years ago, has had the effect of causing the tide to rise a foot and a half higher than it did before. The same is true of the remarkable tides in the Bay of Fundy. Captain Vaughan, dockmaster at the London docks, gave some very important and interesting evidence upon this point some years ago before a Parliamentary committee, on the subject of the embankment of the Thames, and the necessary precaution required to prevent a consequent injury to the navigability of the river. "If," said he, "you narrow the river from eight hundred to six hun-

dred feet, you will lose one-third of the water that now comes up." As the space for tidal water was decreased, so would the rise of the tide be decreased, and its usefulness in carrying away the silt and sewage consequently diminished.

An example of this has been shown by the history of the harbor of Lynn Regis in England, under circumstances so analogous to our own harbor that I must beg leave to make special reference to it. Lynn is situated at the mouth of the river Ouse, which empties into a large bay on the eastern coast of England, known as the Wash. The Ouse flows northerly through a flat marshy country, extending across Cambridgeshire and into Lincolnshire called the Fens, which formerly was so frequently overflowed that the city and adjacent country of Ely are known by the name of the Isle of Ely. Long ago a flood tide extended up to Ely twenty-five miles from Lynn, and at times sixteen miles still farther up to Cambridge. To put an end to the inundation of a large tract of land known as the Bedford level, great dykes were dug fourteen miles above Lynn to receive the water which formerly covered it; the land was drained, and the tidal waters kept in narrow canals; and the consequence was, that the old channel to the sea was lost and the harbor of Lynn almost ruined. The harbor of Lynn may not have been so valuable as the extensive fertile tracts thus rescued to agriculture; but so ignorant were people at that time about the effects of the tide, that the same thing would have been done under similar circumstances behind London or Liverpool, and might have ended in irreparable injury to the kingdom. I beg leave to refer the committee to an interesting article on this subject in Fraser's Magazine, Vol. LXXI. p. 466.

We cannot therefore make a compensation for the space covered by tidal waters by deepening the narrowed channel. At all events it is so uncertain, and this view is sustained by such high authority, that Boston may well dread any such perilous experiments. If I am referred to what already has been done in

Boston harbor, I answer that this process of filling along its shore began two centuries ago, and we have no data whereby we can judge what injury has been done to the harbor, or how much inferior it is now to what it was in the days of Blaxton, Maverick and Winthrop. It is certainly not in a satisfactory condition at present, and my own opinion is, that by an overwhelming preponderance of evidence it is shown to have deteriorated steadily for many years past. If the harbor has been seriously injured, is it unreasonable to assume that the vast encroachments made by man upon the sea, and the consequent reduction of the amount of water which comes in with the tide, have aided in this injury? And is it not our duty to be cautious in permitting these encroachments to be continued?

Another peculiarity of our harbor is the comparative sluggishness of the current. The average velocity of the current of the Thames at London is three miles an hour; the velocity of the current in New York harbor is more than two miles an hour. In Boston it is only one mile an hour. If the velocity of the current measures the scouring force of the water, this force in Boston is only one-half what it is in New York, and one-third what it is in London; and the dangers to our harbor from the silt and sewage increase in inverse ratio.

I shall say but one thing more on this question of the harbor, and then leave it upon the evidence and the arguments of my associates. This is what was stated by Mr. Pratt; that by reducing the velocity of the current you increase the liability of the harbor to freeze in cold weather. This is now prevented by the combined influence of the sea water, which is of a comparatively mild temperature, coming in at every tide, and of the velocity of the current, which prevents its freezing before it flows out again into the open sea; and yet in extremely cold weather it is difficult to prevent its freezing, and every winter the harbor is greatly encumbered with ice, and most of us here have known times when it has been frozen solid enough

for us to pass over it. As you reduce the amount of sea water which comes in, and diminish the velocity of the current, you increase the danger of its freezing. This was so satisfactorily shown by Mr. Pratt that I need not dwell upon it.

But while, gentlemen, there may be differences of opinion among men who are equally well qualified to form one, as to the effect which any considerable encroachment upon the Charles River basin may have on the harbor, it is difficult for me to understand how the impending danger to the sanitary condition of our city can be underrated by any one who has ever resided in a city, or has watched the vast outlays made elsewhere for procuring that fresh air which some among us are so ready to sacrifice. Many experts have been called before you to testify to the influence which the tidal water in Charles River has in cooling the atmosphere of Boston in summer, but I should think that ordinary personal experience would teach all who have passed a summer in Boston the truth of this theory, and as to them have rendered any scientific testimony unnecessary. Ocean water is cooler than the adjacent land; the neighborhood of the sea is generally cooler than territory removed from its influence. Here we have behind our city a large area, which at every tide is filled with this water fresh and cool from the ocean, and which, before it becomes heated, flows out again, and is succeeded by other water of the same uniform temperature. The effect upon the atmosphere above the water, and upon the wind which blows over it, cannot be denied. And I do not care much about whether the wind blowing over it from the west or southwest will sweep over the entire city, or over only a small part of it, the cooling influence of the water will not be seriously changed. Atmosphere is a much better conductor of heat and cold than metal is; yet if we put the end of a metallic rod into a tub of ice, the effect would quickly be perceived in every part of it. Were an iceberg to be anchored in the Charles River, its cooling effect upon the atmosphere all over the city

would soon be felt, whatever might be the direction of the wind ; and so, if the influence of the tidal water is to reduce the mean temperature on Charles River ten, fifteen, or twenty degrees, the adjacent atmosphere will feel its influence. But the prevailing winds which blow over Boston in summer (the west and southwest) are still cooled by this water, although not to the same degree which they were before we shut the tide entirely out of the basin south of Beacon street ; and although they strike directly the more westerly parts of the city only, their influence upon the currents in the streets has been too long experienced by Bostonians to permit us to doubt its existence. The streets in a city will deflect all winds and, to some extent, change their direction.

I contend, therefore, that the heat of Boston is lessened by the tidal water in Charles River, both because the atmosphere under any circumstances would prove a conductor of the cold engendered by it, and also from its influence on the normal summer winds. The question then presents itself, can we exclude the water from any considerable part of this basin without proportionately lessening this benefit ? And I most earnestly contend that we cannot. The great surface covered by the water increases the amount of cold air, because it increases the amount of air brought in contact with the water ; while, as I have remarked, the water does not remain in the basin long enough to experience a corresponding change from the sun. Whatever amount of compensation may be obtained for extent of area, by deepening the narrowed channel, so far as the scouring forces in the harbor are concerned, you obtain no such compensation in the respect I am now discussing. Reduce one-half, one-third, one-quarter the water area, and you proportionately reduce the amount of cool air derived from it.

The appellation given to this harbor basin by Dr. Holmes, of one of the lungs of Boston, was criticized somewhat severely

by an honorable member of the committee, because the basin is outside of the city, and it was likened to a lung on a man's head or on his foot. Now, gentlemen, whether that analogy was correct or not, so far as Boston itself is concerned, it certainly is with respect to Boston and its suburbs. On one side of this basin lies our own city; and on the other side is Cambridge, with its forty thousand inhabitants. The southwest wind blowing over it strikes directly upon Charlestown with its thirty thousand more, and above are Brookline and Brighton with ten or twelve thousand more, and which are destined to contain a very large population; so that this basin is already surrounded by between three and four hundred thousand souls, and to this population it can well be regarded as a lung.

An honorable friend of mine on your committee has asked whether the benefits which Boston thus gains from Charles River might not be increased by filling up and laying out a part of the basin as a public pleasure ground. A public promenade along the border of this basin would add to the beauty and health of the city, and perhaps such an one as has been more than once spoken of here, might be laid out without incurring serious danger; but the finest park with trees fully grown would not cool the air as the water does. I am the last one to depreciate the value of parks; I hope to live to see Boston with a very splendid one, but we are not yet so put to it for land for this purpose that we desire to rob the sea in order to get it. Two of the localities spoken of for a public pleasure ground, Corey's Hill, and the marshes between Parker street and the Western avenue, would lose a large share of their attractions if the Charles River basin were not in existence.

The argument has been advanced that the injurious exhalations arising from the marshes and flats left bare at low water, with the sewers emptying upon them, counterbalance, to a great extent, the benefits of which I have been speaking. I believe that all agree that it would be well now to round off the shore

between Mount Vernon and Berkeley streets; but if that were done to prevent the sewage collecting there, I doubt whether anything else is required. If the sewage and bare flats were as offensive as has been intimated, certainly those living along the shore of the basin would be the first to perceive it. Not only do they not ask to have the basin filled, in order to abate any such nuisance as this, but they are here to protest against it. In fine weather, the Western avenue has long been a favorite walk of mine, and I have for ten years been well acquainted with Charles River at all states of the tide, and in the hottest summer weather. I have ridden and walked along the Mill-dam, I have lounged upon Cambridge bridge, I have rowed upon the water, and I can say that I never noticed anything in the hottest weather and at the lowest tide which really could be called offensive. The flats along the Boston shore are only bare for a very short time, and the saline qualities of the sea water remedy, to a great extent, what might otherwise taint the air. If the sewage should ever become injurious, as I have already said, means can be found for curing it.

Much that I have said I know would apply equally to the filling which has gone on for the last ten years on the other side of Beacon street, in the so-called Back Bay. The building of the Mill-dam fifty years ago had indeed made that a nuisance, which needed to be remedied in some way, and the whole subject was of a widely different character from that now before you. But I do think that in filling those marshes solid, and reserving neither pleasure ground nor a basin for a tidal lake like the *Binnen Alster* at Hamburg, we were guilty of a short-sightedness and a blindness to the sanitary wants and to the beauty of our city which will not raise us in the estimation of our descendants. When, in the next century, Boston antiquaries dig out of the alcoves of the Public Library and the Athenæum the history of that boasted public improvement, and learn that while we were resolutely shutting out the sea from that territory, and

bartering the health and beauty of the city for gold, gentlemen like my friend Mr. Snelling persistently raised their warning voices against so suicidal a policy to no purpose, but received much opposition and obloquy from interested parties in return, they will not be very proud of their ancestors; and I should not be surprised if the newspapers of those days were to speak of us in terms which it will be well we cannot hear. Is not so discreditable a tale as that enough for one generation? Most certainly it is; and the city may yet in consequence have to spend on pleasure grounds and gardens sums of money which would swallow up all that has been made by the Commonwealth out of that land speculation.

I shall notice but one other argument which has been adduced in favor of any scheme for what is called improving these flats, and that is the alleged need of more land in Boston. Now, gentlemen, I deny that there is any such necessity. It will be a century before this territory can possibly be required for business; and as for dwelling-houses, at the rate we have been building during the last ten years, it will be thirty years at least before the Back Bay lands are occupied; and beyond these is an inexhaustible supply of land for building purposes in Brookline, Roxbury and Dorchester, — high land, picturesquely diversified, and infinitely more healthy than any land taken from the sea ever will be. It is farther away, I admit, but you cannot, with Boston increasing as it is now, continue to have all the advantages of a country town. The compactness of Boston in past times has spoilt us for anything more extended, and makes us feel vexed if we ever are obliged to walk more than a few steps. And some excellent citizens, imbued with these Little Pedlington ideas, think that the heavens would fall if they were not able to walk home daily to a two-o'clock dinner. Surrounded as we are on so many sides by water, distances here must eventually get very great. You can no more confine the Boston of the future to this peninsula than you and I, Mr. Chairman, can be

forced back into our cradles. And besides, in trying to remedy one evil, you may incur much greater ones. Captain Vaughan, whom I have already quoted, said before a Parliamentary committee, that by building wide embankments on both sides of the Thames, they might relieve the streets of part of their traffic, but they might also relieve the river of her commerce. So you, by pushing out the sea, may obtain plenty of land, but at sacrifices which will render the land valueless.

In conclusion, Mr. Chairman and gentlemen, I must ask you, what need is there for any "comprehensive scheme" of improvement in relation to these flats? Who asks for it? Who desires it? Certainly the voice of this neighborhood has been heard distinctly enough, and in tones of which there can be no mistaking the meaning. And while I most fully admit that in all matters of State policy the opinion of no one part of the Commonwealth should have the control, yet I respectfully submit that in a matter like this the feelings and wishes of the neighborhood should be treated with respect and even indulgence, and I cannot see why we should yield our opinions to those of people far more remotely, far less vitally interested. But the sovereign prerogative by virtue of which the Commonwealth owns the sea-shore is one of a very peculiar kind. It is not held as she holds ordinary property, but on a special trust for the benefit of commerce and navigation, and other kindred objects. Certainly she does not hold it for the purposes of money-making, or of deriving a revenue from it by means of any species of alienation. If any such profit can be justified when made from it, it is only when subordinate and incidental to some higher and more important purpose. I shall not dwell upon this, but shall refer you to the able opening argument of my friend Mr. Shattuck, and to one authority, but that the very highest — the views of the late Chief Justice Shaw in the cases of the Commonwealth *vs.* Alger, 7 Cushing, 81, and the Commonwealth *vs.* The City of Roxbury, 9 Gray, 481. To

dispose of the shore for the benefit of revenue seems to me very much as if the Corporation of Harvard College were to apply funds given it for a special purpose to the general expenses of the University. We all know how quickly the courts would stop that, and although from the sovereign authority of our legislature on most questions, there may be no similar check on its action, I cannot think it the less unjustifiable. The fact that there is no constitutional restriction on you will not justify you. A law may be dishonest, oppressive or cruel, and yet be constitutional. The legislature may repeal the entire criminal law of the Commonwealth if it sees fit, and allow us to be plundered and murdered with impunity, and such a statute would be perfectly constitutional. Such checks have never been placed on your action, because it was rightly judged that they were not needed; and I trust and believe that the continued preservation of the Charles River basin will show that no constitutional restriction on legislative power was needed to save it for the purposes for which the Almighty Creator intended it.

An attempt has been made to discredit our opposition to this proposal by asserting that it is incited by the wealthy gentlemen whose residences skirt the river. If that were so, it would be no argument. The residents on Beacon, Charles and Brimmer streets are disturbed, and most naturally disturbed, at the idea of losing all the glorious beauties and advantages of that open basin. All men would be, under the same circumstances. Their opposition may be selfish, but happily the interests of all in this world are so interwoven with the interests of their fellow-men that an enlightened selfishness is often the highest wisdom, the highest benevolence. Why, gentlemen, if that basin be once filled up, and if, in consequence, the health of the city should be poorer than before, the air in summer closer, the heat more oppressive, who is it that will suffer? Is it the wealthy citizen, who, by means of a carriage drive, can be refreshed by the country air and the ocean breezes, or seek shelter from heat

and pestilence in his country seat? Or is it the hard-working mechanic or laborer, whom narrow means and unremitting toil keep chained to the city pavement? It is needless to answer such a question. The rights to the benefit of this basin are owned by no one quarter of the city, no one class of society. We all have rights, from highest to lowest, in its cooling and health-giving qualities, and it is as guardian of those who cannot help themselves, and not as the ally of those whose powers of defence are shown by the array of counsel they have sent to argue their rights in this matter, that the city government of Boston solemnly protests against any substantial reduction of the water area of Charles River. Anything done in this respect cannot be undone. Your recommendations may end in irreparable injury; and it is for this reason that we so dread any decisive action in such a direction. Believing that the tidal basin of Charles River is essential to the safety of the harbor, the coolness of the atmosphere, the health, the attractiveness and the beauty of Boston, I can only hope that it will never be said of her, what the men of Jericho said to the prophet of God in the olden time, "The situation of this city is pleasant, as my lord seeth, but the water is naught, and the land barren."

MR. DERBY. Mr. Chairman and Gentlemen of the Committee: When I rose this morning, and, looking from my windows across the basin of the Charles River, saw the light of the rising sun reflected from the windows of Cambridge, and thought that this charming prospect was endangered; when I reflected, sir, that every day at dinner I could see this expanse of waters cooled by the ocean, ruffled by the breezes, rolling in towards my table, and remembered that at night, when retiring, I could see the glitter of the lamps reflected from this beautiful panorama, — when I thought that this spectacle was in danger, and that we were liable in West Boston to be deprived of what seemed to be a boon of Providence to our section of the city, I felt nerved to express the feelings of our people.

I have the honor to come here to-day to represent one of the most important sections of Boston, extending from the summit of Mount Vernon down to the Mill-dam, and from Beacon street to West Boston bridge; a territory which commands a view of this broad expanse, and has a population of some twenty thousand, situated in one of the richest wards of the city, in which property increases at the rate of ten per cent per annum, and exceeds to-day eighty millions of dollars. I felt, sir, that a very important part of this metropolis was in danger; and that it was my duty to exert my humble efforts to arrest an impending calamity. I presume, Mr. Chairman and gentlemen, that the only incentive to action on the part of this committee is the idea of putting money into the coffers of the State. But I would respectfully ask the committee, what would be the object of the money, to be acquired in this manner, if it is to be acquired at the expense of health and vitality? It would be plating the eyes of men with dollars after they have ceased to breathe. I suppose, gentlemen, that the inducement to the committee is the fact that some profit has accrued to the State from the filling in of the property south of the Mill-dam. Let me draw the attention of the committee to the history of that enterprise, and show that the basins on the two sides of Beacon street are entirely different, and that what might result in profit on one side would result in loss on the other. Let me carry you back to the history of the enterprise on the southern side of the Mill-dam.

Half a century, sir, has elapsed since there was an excitement in State street, a great commotion, and an assemblage of eager men around one of the insurance offices. Coats were torn, hats were destroyed, there was a clamor and a determination to subscribe to a new undertaking. The Mill-dam enterprise was thus inaugurated. A bridge had been very successful. It had returned more than a million for forty thousand dollars. I allude to the old Charles River bridge. Factories had been

built at Waltham, and had paid large profits; and it was proposed to connect the city with them. It was proposed also to move down the factories to the very gates of the city, and bring Waltham almost into Boston, and create a great water power for the mills of the Commonwealth. This was the object in view, and in this commotion the stock was subscribed, and the enterprise undertaken. But unforeseen difficulties were encountered. It was found, sir, that there were unfathomable depths in the quagmire, and the piles would not reach sound bottom. At length the enterprise came to a stand-still, and when a school-boy I came to this city, in 1819, the Mill-dam was still unfinished. At last it was completed. What was the result? It resulted in the loss of the investment. All that remained was the interest. The interest was represented by the stock, and only the interest; the capital was gone. There was an extinction at that early day of six or eight hundred thousand dollars. And if the enterprise had been undertaken later, I presume the loss would have exceeded that sum, and that there would have been an extinction of at least a million and a half of capital, or more than the profit that has been realized by the commonwealth from the filling inside of the Mill-dam. Its whole profit would have been absorbed. But it was not in its results as a commercial enterprise alone that it was a failure. It brought other losses to the State. It impaired the value of our harbor. It occasioned the largest deposit in the lower harbor. It aided to remove nineteen hundred thousand cubic yards of land, which has been washed down from above and from the vicinity of the bridges into the lower harbor, and carry it where it was not wanted. I refer to the three last reports on the harbor where these facts are given in detail. There were nineteen hundred thousand feet found below the bridges, and a large deposit between the bridges, and a wearing away in the vicinity of the Charles River bridge.

There has been a disturbance, sir, of these elements, and the

result of it has been that in the aggregate twenty-four hundred thousand cubic feet of land have been moved, which, if you were to take it out again, would cost seventy-five cents a cubic yard, or something like six dollars a square. And it will be required to be moved out in different localities to accommodate the largest class of vessels. Should you bring in vessels like the "Great Eastern," it would become necessary to remove all this deposit. That is one of the calamities. But there was another, and that was in the loss of the health-giving breezes that swept over the space that had been filled, which invigorated the people of Boston. It became a mere receptacle for the drainage, merely a reservoir for the sewerage of the city; and there sprung up there marshes, with sedge partially covered at high tide. It became a nuisance, and it has subjected the city to an expense of three-quarters of a million of dollars in the raising of the Church Street District, with more in prospect, in consequence of the exclusion of the sea, which carried away the drainage of Cedar street, Fayette street, and other streets in that locality. The city now, at a time when it has to pay a premium on gold, when the bonds of Massachusetts have been selling from eighty to ninety cents on the dollar, will be compelled to pay more than a million of dollars for raising this district. And you have had evidence in this case from Mr. Hills, the city assessor, that if you carry out this filling of the Charles River basin as now proposed, it may become necessary to raise Commonwealth avenue and the Public Garden, and to elevate the buildings that have been constructed in this vicinity; that you may be compelled to raise this area six or eight feet in order to preserve the necessary drainage. I have described the condition of the empty basin when the State was called upon to do something for Boston. It had created a nuisance, and the question was, how it was to be remedied. The State was precluded from letting in the sea again. If the sea had come in, it would have overflowed a large section of the district

to which I have referred. That thing could not be done. The State looked around to see what it could do. It concluded to take advantage of the mistakes that had been made. It had sanctioned the Mill-dam, and it said, "We will step in and take advantage of its effects. We will avail ourselves of them. We will take advantage of the work that has been done by other parties. We will avail ourselves of the Public Garden, which the citizens of Boston have created, and we will induce them to improve it and beautify it, by giving them a little more land beyond. We will buy out the riparian proprietors, by allowing them more land on Tremont street. We will quiet the Mill-dam proprietors by allowing them two hundred feet on the northern side of the Mill-dam. We will quiet the Water Power Company by allowing them to fill up farther. And we will take the cream of it ourselves. We will see if we can realize some profit." And a profit to the State, sir, has been realized from the mistakes of its subjects. If the State had enclosed the area, and undertaken to fill it, it would have resulted in a loss. But what has been the result? It has been, according to the evidence as placed before you yesterday, that the cost of the filling of this area has been sixty-six cents per foot, for vendible land, independently of the Mill-dam and independently of Beacon street. The commissioners have taken out forty per cent for streets. If you include Beacon street, it would be forty-five per cent; and that amount should be included in any estimate as to the northern side of the Mill-dam. But I see no prospect of a Public Garden on Charles street, or in that vicinity. If you are to place this area upon the same footing as the land on the other side of Beacon street, you must make the same advance for improvements and avenues before you can bring the land up to the same market value. At all events, if the State has taken out forty-five per cent on the one side, you must take out forty-five per cent on the other.

Then we start on the basis of sixty-six cents per foot, as the

cost previous to the war. That is the cost of simply filling the land. What is to be the cost on the other side of the dam? You cannot do the work, sir, at the prices previous to the war. You know labor has advanced from twenty-five to fifty per cent. You must add at least, on any fair computation, twenty-five per cent. There were the Boston and Albany Railroad and the Brookline Railroad coming in conveniently to supply the gravel for the filling on the other side; but the former tracks are gone, and the earth must be carried further. It must be carried across the Western avenue and across the Boston and Albany Railroad, or else you must resort to the Charles River, and bring up the clay and mud and hard pan for the purpose of filling, and after you have done that, you will have an area filled with inferior material, and less valuable in consequence of the character of the filling. But at all events, in regard to the expense, you must consider that the expense will be increased at least twenty-five per cent in consequence of the change in prices.

Then you are going into deeper water. You are not going into an area bare at low water, with the exception of some flats near the Cambridge side. From Cambridge bridge to Brimmer street, and up to Berkeley and Clarendon streets, until you reach the end of the present line of buildings, you find no flats that are bare at low water within eleven hundred feet of the dam. The average must be twelve hundred feet. If you measure on the bridge, the distance is thirteen hundred feet. But there is no space bare along the dam until you approach Exeter street, where for two squares the flats show themselves at low water. When gentlemen talk about flats, I wish it to be understood that the flats lie on the Cambridge side. And the maps that we have referred to during this hearing show that there is a channel varying in depth from twelve feet to twenty-two feet at high water, being depth enough to float a ship of the line, at high water, in the space which lies abreast of Brimmer

street and the west of Western avenue which for years has been built upon. And this is the area which you are to fill. And now, gentlemen, I put it to you that with this increased depth, in a locality which is covered at low water, as compared with the marshes and fens on the other side of the Mill-dam, you must add at least twenty-five per cent to the cost of filling. Taking the two items together will make at least fifty per cent to be added to the sixty-six cents per foot, the bare cost of filling on the other side, and you will have ninety-nine cents per foot, or, in round numbers, a dollar per foot for filling.

It was intimated that some estimate had been made — I think this came from Mr. Nathaniel Whiting yesterday — a long time since, in 1857, which assumed that the gravel could be taken out of the Charles River for twenty-two and a half cents a yard, and put into this area. No such proposals were exhibited. Mr. Boschke does not intimate in his recent report that this can be done for twenty-two and a half cents. He refers to another proposition that was made to do it, and you have evidence of one man who put it at seventy-five to eighty-seven and a half cents per cubic yard. These are prices at which the work can be done to-day; and this work, instead of being done for twenty-two and a half cents, will cost somewhere from fifty cents to a dollar per yard. The filling here must cost fifty per cent more than upon the other side. For the bare filling you will have to expend, in round numbers, one dollar per superficial foot.

But, Mr. Chairman and gentlemen, you have then but just begun. It is not the mere filling of this area that involves expense. Where is your sea-wall? What is your sea-wall to cost? Over in South Boston they are running one at the cost of two hundred dollars per running foot. And at Fort Point Channel, they are running a sea-wall at the cost of forty-five dollars per lineal foot. Now, what kind of sea-walls have you to build, when you enclose this area? One wall does not

suffice. You are going to enclose a large area. Various plans have been proposed. It has been proposed to have three hundred feet left for the river channel, and the channel was to be carried over on to the Cambridge side. It was then proposed to have five hundred feet left; and then, the possibility of its being widened out to one thousand feet was suggested. I will assume, for the purposes of this hearing, that the committee will leave a thousand feet for the river, and will not enclose more than a thousand feet in width. We will take it, then, at a thousand feet. The present distance between Cambridge and the Western avenue is two thousand feet. That will give you an area of a thousand feet wide to fill from the cross-dam down to West Boston bridge, or six million feet to enclose. You must place the channel to the north and west of this line, and you must build a wall in the channel itself.

It has been suggested at various stages of this inquiry that it is proposed to make a compensation by deepening the channel. I will assume that you do deepen it at low water, and excavate other flats for a new channel through the hard clay, where, according to a statement made early in this case, the oyster-men sometimes would have to put in a crow-bar in order to set an oyster stake. You have to excavate from ten to twenty feet below the depth of the water at low tide, and along this channel you are to build a wall. What will that wall cost? I assume that it will cost a hundred dollars per running foot. Then measure the distance out from the cross-dam a thousand feet, and running down to the bridge, — and you do not stop there, — there is still some distance that you must run on. You have brought the new channel down to the bridge; and then the channel has to be carried on the other side down to deep water, and it will not reach deep water until you come to Craigie's bridge; and thus you would have a wall of ten thousand feet in length. There is a million of dollars to be paid out for the building of that sea-wall, and this will be an addition of thirty cents a

foot to the expense of the filling. Then there is the excavation of the channel. Taking it at seventy-five cents a yard, which is what the commonwealth is paying in the lower harbor, and all the expenses which are to be encountered, and if you get off for another million dollars you will be very fortunate. Thus comes in thirty cents more, and you carry the expense up to a dollar and sixty cents per foot.

But that is not all. You are going to change the channel very much. You are going to straighten the channel. That is exactly what you do not want to do. The curve of the channel is precisely what we require. It winds around towards the Mill-dam, and then runs at right angles with the bridge, just as it ought to. The vessels approach the draw, and pass at right angles, just as they should. The straightening will be an injury. You will destroy the right angle. You construct a wall at a distance of a thousand feet from the Boston shore; and when you have reached Cambridge bridge, what have you to do at that point? Is there any draw there? The new draw must be placed a thousand feet from the Boston shore. Those that have been built are being widened to forty and fifty feet. One draw on which there has been some progress made is to be demolished. And if the draws are to be demolished, an expense of two hundred thousand dollars is to be incurred in superseding draws. And if you seek to obviate this by bringing the line down to Mr. Coolidge's house at the corner of the Cambridge bridge, if you make an oblique line, you cut off a third of the area, and throw the expense on a less number of feet, and the result will be that under these circumstances the expense will be proportionately increased. I take the area, however, as it is presented to us for discussion; I take the channel as presented by the committee, and the result will be that two hundred thousand dollars will be added to the expense of this filling for the cost of altering the draws.

Then, gentlemen, having come to this point, what other expenses must you encounter? We have wharf rights from the Mill-dam down to Craigie's bridge. There are wharves, sir, with the right to go out to deep water, with the right to lay vessels outside of the line. They are authorized, sir, to come to the commissioner's line. They are allowed to exercise jurisdiction beyond the commissioner's line, for the purpose of commerce. There are wharves, at every estate, and running from one estate to the other. Here are landing places for lumber materials from Maine, the property is well occupied; at one place stone is landed, at another large quantities of slate are landed, and other building materials. Pass on, if you please, to Mr. Braman's, and there you have boating clubs, contributing to the health of the young men of the city, and strengthening their nerves; and this arm of the sea has become a great pleasure-ground for the young men of Cambridge. The shore from the Mill-dam down to Craigie's bridge is fringed with water rights, and the right to lay vessels there. How are you going to deal with them? How is the State dealing with them in the South Bay? Look at these plans of the water rights there, and you will find in front of Seth Adams's wharf, and other wharves, the commissioners have left a channel, and are making an island. In filling up the South Bay, they have respected the shore owner's rights. And at this very moment, sir (I have it from one of the commissioners), they are endeavoring to close the new channel by the purchase of the water rights. It can be done, sir, by purchase only. And do you think these people owning rights on the chaunel of the Charles River, having the privilege of laying two or throe vessels abreast at the end of their wharves, with the right, sir, to sail up to Watertown or down to Winthrop.—do you suppose that they are going to release the rights which they hold there without any compensation? Here is a direct right, under the very seal of the Commonwealth, on which they stand. And, sir, they have a protecting power outside of the Commonwealth of Massachusetts,

in the government of the United States, the same power which protects the harbor from a bridge across it to East Boston. If the harbor commissioners learn, as I presume they will, that the filling will be injurious, and you decide that this space must be filled up, the direct action of Congress will be invoked; and if, sir, the action of Congress is not invoked, the Supreme Court of the United States by injunction or intervention will protect the riparian owners.

I will, however, assume that half a million of dollars will extinguish these rights. Add to it the cost of draws and interest while the work is being done, and you will add thirty cents per foot more, and carry the price close to two dollars per superficial foot.

I put these statements before you not as assertions merely, but as deductions from the evidence in the case. Now, gentlemen, suppose you have done this deed, that you have filled this area, that you have converted this beautiful arm of the sea into terra firma, and with certainly a very inferior material, unless you bring the gravel down from the country. You have given a different character to this land. It differs *toto cælo* from the land on the other side; and if you have a better quality of land, you will have to incur an additional expense.

I have asked you what this undertaking will cost. Now, let me ask you, what will you get for it? Who wants it? Do you think gentlemen who now live on Beacon street would come out and build on a channel five hundred feet in width? What confidence would they have in the State of Massachusetts? What confidence would its deeds inspire? Do you think I would trust the State under such circumstances, and go and build another house, and spend twenty, or thirty, or forty thousand dollars upon such a house? And you will have no gentlemen of the class that build upon Beacon street to go down there and buy these lots for dwelling-houses. It must be an inferior class of dwelling-houses that would be put up there. — You may

sell some lots for stables, and for wood wharves and coal wharves upon the river, and some for factories. You have a territory down on the other side of the Mill Pond where land may be bought for a dollar and a quarter a foot. And this would sell for less. It would be longer in the market; and it would sell for a dollar and a half, and a dollar and a quarter a foot, doubtless down to a dollar a foot. And you would have your investment of six or eight millions of dollars valued down by the assessors of Boston, and you would find that this land that you have filled, where filling will be an injury to the city of Boston, worth a million dollars less than its cost after you have filled it, besides the irreparable injury which is done to the adjacent property.

What is that damage? What is its character? In the first place, a direct injury to the Commonwealth, which has many thousand feet of land, partially built upon, for sale. The mere discussion of this matter has already damaged that property ten or fifteen per cent; and the first act that is passed by the State looking in this direction will make a further deduction in the value of the property. It is an immediate injury to the State. But how is it with the residue of the property on the Back Bay, where the drainage is to be affected? How is that to be affected? All the evidence goes to show that the injury will range from fifty down to ten per cent from the Back Bay lands, to those on Mount Vernon street.

Well, now, sir, let me ask who suffers? Who own the Commonwealth of Massachusetts? Who are the State? When the Revolution ended, the valuation of the State was some twenty millions. It did not exceed its debts. The State in the great struggle for independence had to use all its wealth. It was absorbed by the war. And what we have to-day is an accretion since the treaty made in 1783. But I put it to you in this illustration of my point, that all the property of West Boston is the property of the State, and all of it was called

upon during the late struggle. Did not you tax it? Don't you tax it just as much as you please here in the State House? It is all the property of the State. It may be held partly by rich men, and partly by poor men, but the State has an interest in the whole. And let me ask you, as trustees and guardians of the public, whether it is not your duty to regard the damage to this part of the metropolis, and to treat it as the property of the State? Let me ask you another question, gentlemen. Is not the city of Boston doubly and trebly interested in this question? Is not the city of Boston a large portion of the State? Does not its valuation reach to one-third of your entire valuation? Does it not pay more than one-third of your taxes? And has it not paid that proportion for the last twenty years? And is it not to-day paying more than two-fifths of the taxes, since you have added Roxbury and Dorchester? Is it not going to pay half the taxes of the State? Should not the views of the city of Boston be regarded in a matter of this kind, when one-half of your levy is to be borne by the city of Boston? Is not the position of Boston one that should give it a potential voice in this case, when you are going to diminish the value of its property, and compel it to bear half the loss? It seems to me that the decision of the people of Boston should be almost conclusive on this question, and should weigh down the voice of Watertown and any of the smaller villages. I respectfully submit to this committee that upon the evidence in this case the damages that will be done to the Commonwealth, in which you have, or ought to have, an interest, will be equal to the whole expense of filling which you are about to incur.

I have touched, gentlemen, upon a few of the considerations in this case; and I now pass to some of the other important subjects which present themselves to my mind as objections to this entire project. And I touch, gentlemen, first upon the subject of drainage. If you extend the land a thousand feet beyond the Mill-dam, the present drains will suffer. They now enter the

sea six feet below high water mark. They are covered sixteen hours out of twenty-four. If you extend them a thousand feet they will have but two hours in each day to empty their contents. The reservoirs will be filled with garbage, and their contents carried back into the cellars. It has been suggested that this may be obviated by a great sewer parallel to the Mill-dam, and running down to deep water. Possibly some relief may be had, but you cannot get it without a great expenditure. A vast sewer must be carried down under the level of the sea, and will not empty at all without the assistance of steam pumps. Will that be desirable drainage for the city of Boston? Will it answer the purpose? I would prefer, instead of throwing this drainage into the harbor of Boston, to turn the course of the drains, and to have the drainage taken up the stream, and carried on to the marshes and meadows of Watertown. The experience of Europe will soon show whether it is possible. And I presume that when the time comes to consider the question of utilizing drainage, it will then be the time to determine whether the drainage shall be carried to the interior or into the harbor. But, gentlemen, we can defer that for a long period. At present, the Charles River serves for the purposes of drainage. It is said that if you deepen on the Cambridge side you increase its capacity; but you must deepen it on the Boston side. For the present, it answers perfectly well for drainage. When the time comes for deepening, we shall be able, I trust, to incur the expense.

But, gentlemen, another point to which I wish to call the attention of the committee is this: that you require, for the purposes of drainage as well as of navigation, the whole of this area of two thousand feet between the commissioners' lines; and I think I can demonstrate that even this will not suffice for the coming half century. What is the depth? The average depth on the Boston side is from three to four feet at low water. It ranges from nothing to four feet. On the Cambridge side, the

bed of the river is bare at low water, but may be materially deepened. The average depth at low water between the commissioners' lines is less than a single foot. What is the rise of the tide? Eleven feet. Now, gentlemen, I want to compare Charles River with another estuary of the sea, where there is a higher tide, a stronger current, and a less width. I refer to the river Thames, as it passes the city of London. It is crossed by many bridges. These bridges from abutment to abutment average a thousand feet in length. The river between the abutments is a thousand feet in width. What is the depth of the Thames as compared with the Charles? The tide is twenty-one feet in one case, and eleven feet in the other. The rise of the tide is twice as great in the Thames. The depth of the Thames is thirty-two feet at high water, while in the Charles the depth is but twelve feet. It is nearly three times as deep. And when you come to the question of speed, it runs through the city with a fall of one foot to the mile, with a speed three times the speed of the Charles. The volume of the water is from two to three times as great as the volume of the Charles. Well, then, we have a river to which the Charles is not equal. The Charles, with its two thousand feet, is only equal to one-third or one-half the Thames. The question is, whether the Thames has sufficed for the drainage of a large city? It has been a failure for ten or fifteen years past. For some twenty centuries, it was sufficient. London was founded by the Romans in the era of our Saviour, and down to ten or fifteen years since the Thames had answered the purposes of drainage; but then it was found that the drainage was too much for the river. The contents of the drains were washed back again, and were lodged on the banks below the Parliament House. And the result was, that London was obliged to incur a vast expense, and it had at last accounts expended some four millions sterling, or twenty millions of dollars, for a sewer parallel to the river for drainage. I put before you a statement of

the population of London in 1777, during the Revolutionary war, and showed you that then, about ninety years since, the population of London and its environs, now incorporated into the city of London, was less than six hundred thousand. There are various estimates of this people, but I take the largest. At the present time, within the same limits, there is within and around the city of Boston a population of from four to five hundred thousand people. By 1877, that population will exceed six hundred thousand, at its present ratio of growth. We are doubling once in twenty years. In fifty or sixty years, we shall have the population of London. All the indications show that the growth of Boston will be on each side of the Charles River; on one side within Roxbury and Dorchester, most of which, if we except a portion of Dorchester, will drain into the Charles; on the other side, from Charlestown and Cambridge up to Brighton and Watertown, the whole will drain into the Charles. And now, gentlemen, I put it to you that we require the whole of that river up to its full width of two thousand feet between the commissioners' lines. We require the whole of it merely for drainage. And if you narrow it, you render it insufficient; and I predict its failure. I venture to predict that if you narrow the channel of the river down to five hundred feet, it would be a failure to begin with; and that if you narrowed it down to a thousand feet, it would be a failure within ten years. When our debt is paid, and our streets are widened, streets originally made too small, too narrow, too crooked by errors in legislation (either municipal or State, I know not which), — when we have corrected these errors, and our population is doubled and trebled, we can better bear the expense of such undertakings as drains parallel to the river. But when we are expending, as I presume Boston is to-day, two or three millions in so many improvements, we can ill afford to enter upon any such project.

There is another matter connected with this proposed change, which I will not call an improvement, but a calamity, for I propose

to deal with it as a calamity which may befall the city, unless your committee has the intelligence and good sense to avert it. I desire, then, to draw your attention to the effects not only upon the drainage, but the effects upon the piles. It has been the policy of the State to encourage the filling and to fill the great area which lies south of the Western avenue. It has there sold its lands, and the buyers have placed their piles. These piles have been driven with reference to the commissioners' line. The commissioners' line has been established, and been considered sacred, for the last thirty years, since 1840. The only changes made in this line have been for the purpose of widening Beacon street, and for rounding off a corner, to which my associates here have drawn the attention of the committee. And this I construe as my friends have construed it. I construe it as an intimation on the part of the State that under no circumstances was this area to be enclosed for building purposes. The little space to be filled outside of the Mill-dam was for trees and grass, and for the purpose of correcting a nuisance between the shore lines. The provision that no building should be placed upon it seems to be a pledge on the part of the State, in addition to the establishment of the commissioners' line, that this line is never to be exceeded, but is ever to continue. And I ask you whether it would be laudable on the part of the Commonwealth, after encouraging parties who relied on the faith of the State, to come and expend their money and build houses for their old age, and provide homes for their children, comfortable and pleasant homes, on the borders of this broad river, to then change the line which had been established, and ruin their property by any such measure as is here proposed. I ask you whether such action is consistent with the dignity and good faith of the State? Certainly it cannot be, without it gives an indemnity to the extent of the injury. But I was advertising to the injury to the piles. Any gentleman who referred

to the commissioners' line when building his house, had reason to expect, if the water flowed in up to his line, that the water would never be prevented from coming to that line. He had the right to assume that such line was the right one. There was no fool-hardiness on his part in not going down to the extreme hard bottom. He could see no reason to go down to hard bottom. He referred to the statutes of the Commonwealth. Governor Andrew was consulted in regard to it. Various parties were consulted; and we acted upon the assurance of the State that this line was to be enduring. And I respectfully submit that there is a damage to be incurred here, for which parties would have a legal and equitable claim to indemnity.

I pass from this consideration to another. What is your policy and the policy of the State as to the expansion of Boston? Is it the policy of the State to reclaim land from the sea for the purpose of erecting dwellings? Is it the policy of the State to expend two dollars per foot for making land from the sea, when we have high and elevated land which we can occupy? Is it policy to extend the limits of the city in that direction, when there is an area right before us admirably adapted for building? Let me ask you where there could be a more beautiful site for the elegant residences of a city than out on the Highlands? Where, gentlemen, could there be a more desirable and healthy position in any locality around Boston? Let me ask you, is it your province as legislators, or is it the province of the State, to induce people to go down on the docks and build upon the dock mud, and spend two dollars a foot in filling and fifty cents more for piling? Is it your policy to oblige them to build there, or to let them go out into the country where they may obtain land cheap, and also get exercise and air? Gentlemen, I respectfully submit, that you should induce the people to avail themselves of the privileges which nature gives them, and not urge them to settle down upon the docks and unhealthy lowlands.

This brings me, gentlemen, to the sanitary conditions of this case. And I will dwell but a moment upon them, because the evidence has been so clear and uncontradicted that I deem it unnecessary to enlarge, at any length, upon these considerations. I would say, as my friend Dr. Holmes has, that the estuary of the Charles is one of the lungs of the city, a great sea park, a park superior to any other. And it is a poor consolation to the people of the ward in which I live that, because the Common and the Public Garden are one side, perhaps half a mile from their homes, therefore they shall be deprived of this sea park on the other. They have chosen their locality, and made their investments with reference to both. They claim the advantage of both; they are ready to part with neither. Neither is to be surrendered. They will never consent to be deprived of them.

Let us pass from this topic, which has been so well and so ably discussed by the other gentlemen in this case, to that of the navigation of the river. We want width for navigation. It has been said here, sir, that boats and vessels that pass up the river rarely beat up. Why do they not? They want this whole area between the commissioners' lines. They want two thousand feet, and not one thousand. Give us the two thousand feet, or nearly half a mile, and these vessels can sail up the river without availing themselves of steam-tugs, can make use of this great area. We want this space for the purposes of navigation. And the number of vessels (some fourteen hundred a year) is increasing. They will double in number in the course of a few years. The shipping will increase as soon as our legislation on the tariff is perfected,

With respect to widening the river, it is a minor question compared with the mischiefs and injuries to the city of Boston which must result from filling. It is altogether a minor question; and if we compare one with the other, the difference must be seen at once. How is it with these gentlemen from Watertown? It seems to be proposed by them to make

Boston a mere dumping-ground for Watertown. They wish to have the earth, embedded on the Charles River at Watertown, bought by the State for the purpose of filling up this estuary, and so get their river deepened without expense. It is to be done at the cost of Boston, not at the expense of Watertown. Let the people of Watertown and the people of Brookline make their own improvements; but do not fill up this estuary merely to make a receptacle for gravel. Let the case stand on its own merits. This territory is sacred, and is not to be filled up merely for the benefit of Brookline and Watertown.

I pass, gentlemen, for a moment, to another subject, which has been almost exhausted by Mr. Hill, and that is to the harbor. As to the harbor of Boston, let me say, that I have practised at the bar of Suffolk County for thirty years; and from the time that I first addressed a jury or appeared before any committees of the General Court, I remember very well that the commissioners' lines were considered as sacred, and have been very generally respected. If we crossed them even with a bridge, there was great reluctance, great difficulties to be encountered. Now, gentlemen, for thirty years past the State and the City of Boston have employed the ablest scientific men in the country. They have all come to one conclusion, namely, that these interior basins should be preserved, that they are of importance; that there have been displacements and changes in these basins and in the channel and the lower harbor; but that the former now balance the latter. They all agree in that opinion. Is the State prepared, after having incurred the expense of these scientific men, and after having invoked the aid of Congress, to unsay all that has been said, abandon all the conclusions at which science has arrived? Is it treating these gentlemen with a proper respect to go directly counter to their recommendations? Are we to incur so great an expense for these surveys and these results which we have obtained, and then abandon

them? Are they to be treated as of no value? Is there to be some new and sudden conclusion? Are you prepared to say that because the channel can be kept open by dredging, it is best to enclose these basins and destroy them? Recollect, gentlemen, that as the city grows, the amount that comes in by drainage is annually increasing. And will you diminish the scouring power of the ocean?

Let me call your attention to the harbor of Marseilles, which became so offensive that they were obliged to dredge it, and keep dredging machines almost constantly in motion. They were obliged, gentlemen, after having nearly lost the inner harbor, to make two outer harbors or basins by carrying out piers into the sea. They have been obliged to correct the mistakes of the past; and because they had no river they were obliged to make one, creating a very large water power.

Look at Chicago, to which the chairman has once or twice adverted. With a population of two hundred thousand, the river became so offensive that they have been obliged to make improvements. And what are they doing? They are running a canal to the Illinois River by cutting down through fifteen or sixteen feet of solid rock. They are going to make a current from the Lake into the Illinois River, and improve the navigation both of the harbor and of the river. They are now doing it. But for the purposes of drainage, you know that the city of Chicago has been obliged to raise itself up ten or fifteen feet into the air; and is now making a river to run down to the Illinois. They are making parks, three or four of them, around the city. They are resorting to artificial ventilation as well as to natural ventilation from the lake. They are improving the drainage. And let me say that the river of Chicago accommodates a navigation greater than the navigation of New York in the summer season. Statistics show the arrival there of more tonnage than is recorded in the custom house in New York. They receive twelve hundred million feet of lum-

ber during the season, four times the quantity shipped from the Penobscot. The amount of grain is immense. The quantity of coal is very large. The population is becoming very large, and the river is becoming foul and offensive; and it is to be turned down to the Illinois River for the purpose of improving the navigation as well as the drainage.

Now, gentlemen, we have a river. We do not have to make it, as in Chicago, and in London. We have it. All we have to do is to retain and to deepen. And shall we sacrifice it? And fifty years hence, when you and I, Mr. Chairman, have passed from the stage, shall our grandchildren have to come up here, and perhaps in this very room make the appeal that their ancestors committed a great mistake in cutting down the Charles River to a thousand or five hundred or three hundred feet, and beg the legislature of that day to undo what has been done, and widen out the river to its ancient size?

In ancient times, it was said that every river had its deity, and that the ocean had its god, and that sometimes the river god appeared and confronted the disturbers of its peace; and that sometimes old Neptune rose, trident in hand, to allay a commotion. And if in our haste we undertake to violate these streams, we may expect to see, if not those divinities, the river and the ocean, *in propria persona*, rise up to overwhelm the structures that encroach upon their domain.

There is a couplet of Latin poetry that comes to my mind which may bear repetition here:

“Rusticus expectat dum defluat amnis at ille
Labitur et labetur in omne volubilis ævum.”

And I trust, gentlemen, that, within the limits that have been prescribed to it, this river will flow, and flow forever, a source of happiness and prosperity to the people of Boston and also to the people of the whole Commonwealth.

I have but one further suggestion to make, although I have passed by much of the evidence that I deemed important in this

case. In other hearings in which I have taken part before committees of the legislature for the last thirty years, when changes were to be made in the railways or public improvements, it has been customary to show an exigency. The rule has been, that there should be no great changes made unless there was a great public exigency. I hold that in this case there has been no exigency shown; and that there is no exigency for filling up this area of any kind; and that until that is shown, no such filling should be permitted; and you will be reversing the past policy of the State if you allow it to be done. And if it is to be done for the purpose of speculation and the sale of land, there must be shown a great commercial exigency which surely does not exist.

Mr. PUTNAM. Gentlemen, it appears to me that as you consider the question which is before you here, there are one or two things that will strike you as perfectly clear.

In the first place, this is a tremendous undertaking. Put it as mildly as you please, gentlemen, whether you take the plan, as drawn by the engineer, which was shown us at the first meeting, and which I am glad to understand that the committee do not adopt as their plan, or take any large or considerable amount of filling to be done in that direction out from Beacon street and Charles street into the river, changing the channel of the river in connection with it, it is a tremendous undertaking. It is one before the mere magnitude of which any corporation, and even this great Commonwealth, might well stand and hesitate for a long time.

There is another consideration which is perfectly clear, I think. That is the one which brings me here; and it is this: that any such change as is proposed here now will be a very great and serious injury to a large amount of invested capital, to say nothing of the considerations which affect private individuals in their senses and in their minds and in their bodies, and referring only to what affects their purses. Here is a great

and expensive undertaking to be proposed to the State, which will be accompanied with great and serious injury to an enormous amount of property.

Now, then, the question naturally arises, why should this be done? I presume that in dealing with the Commonwealth we are dealing not with a powerful and rapacious landholder next door, who means to insist upon the whole of his legal rights. If I did, I should not feel that we were in great danger; because I regard our legal position as sound and impregnable. But I do not think it courteous to a committee of the Legislature of this Commonwealth to argue this case merely upon narrow, legal and constitutional grounds. I understand that we are dealing with a great, and strong, and just government, and not with a grasping neighboring landholder. And therefore I assume that the committee, in treating all this enormous private interest which I in part represent, will regard it as an interest to be dealt with tenderly, as by a government which has in charge the rights of all its citizens as well as its own corporate rights as a State.

And here, gentlemen, is a good opportunity to point out a distinction which, it seems to me, the committee cannot fail to see—and which has not been much pressed upon them—between the duties and the rights of the Commonwealth, as a mere landholder, and its duties and rights and powers as a government. As a mere landholder, the Commonwealth may say it owns the fee of Charles River. “Why shouldn’t we build on our own land as well as other folks; if you have no legal right to prevent us, why should we not go on and build?” But when we say we have built our houses on these lines established by you, by the Commonwealth, we have laid out our land according to the plan furnished by the Commonwealth, which we were required to follow, and having “Charles River” in great letters on it, and following the lead of the commissioners of the Commonwealth who laid out their lands, as well as ours, upon the theory that the Charles River was to be a great and per-

manent feature there; we say that even as a landholder you have no right to destroy the value of the improvements which we have made at great expense in the just expectation raised and encouraged by you, that the river which gave them their value was to remain. But the Commonwealth may retort, "We *take* the rights belonging to your lots, and we have a right as a government, in the exercise of eminent domain, to take away property, and all you can claim is full compensation." Now there is a mixing up of the notions of the Commonwealth as a landholder and as a sovereign having the right of eminent domain. And I undertake to say, the Commonwealth has no right to step in with its powers as a sovereign in aid of its rights as a landholder. It has no right to take away our property for the purpose of improving its own. If it comes to us as a landholder, and claims to use its land adjacent to ours, it is subject to the rightful and just claims of its neighbors, just like any other landholder. But if it comes as a government, with its eminent domain, to take away these rights and privileges of ours, it can exercise that supreme right only subject to the limitations which any just government must always submit to; and the first of these is, that it must be for some great public purpose; there must be some public exigency other than the advancement of the interests of the State as a landowner, to entitle the Commonwealth, to entitle any good and just government, to come in and take away these valuable private rights. And, therefore, I have approached this inquiry, and I believe most of those associated with me have approached it, in this way: Is there, we ask, any public exigency which calls for the Commonwealth's stepping in here and taking away these valuable rights of ours, and destroying this valuable property that we have created here, with or without compensation? And it seems to us, gentlemen, in the view that the committee took of the case to start with, a view of which I never have made the slightest complaint, and do not now — it seemed to us,

I say, necessary in that view to show negatively that the exigencies did not exist which would justify the proposed action of the State. The public exigencies that naturally occurred to us, as *possibly* inducing the committee to believe that such action should be taken, were those upon which we have introduced evidence.

First, the harbor. Is there anything in the condition, present or future, of Boston harbor that makes it necessary that any such great change in the basin of Charles River should be made as proposed here now?

I do not suppose that the views of the members of this committee, who have investigated the subject, on the present regime of the harbor, and the effect of the present forces that constitute and keep up the harbor, differ very materially from those of the scientific men who have made the harbor a special study and the commission intrusted with the charge of it by law. I suppose if there is any difference of opinion between you and them as to the condition and requirements of the harbor, it is as to the importance of keeping up the present system. I do not suppose that you, Mr. Chairman, differ with all the commissioners who have reported upon the harbor in the main point, that the force of the current in the harbor, is kept up by means of the power of the ebb tide issuing from these broad tidal reservoirs through comparatively narrow channels, carried at a greatly increased velocity and keeping up through the main channel of the harbor a certain velocity and a certain depth. I suppose that you would agree that the narrowing and the abridging of the areas of the tidal reservoirs would probably diminish the force of the current. But where I take it you disagree, if you disagree at all, is in the value of the force of this current. If you disagree at all, I suppose it would be in the amount of importance that you attach to the keeping up of this current. They say, "Here is a combination of natural forces, keeping up this tremendous force, this current of water between Boston and East Boston, which

is known as the upper harbor. This is a tremendous force (I use big words, but I am speaking of big things, and I use them with a full sense of their meaning). Here is this tremendous force. It has the power of carrying off a certain amount of silt and other matter, and preventing it from sinking to the bottom. How much solid matter there is there that might be deposited we do not know, and they do not know. They think there is a great deal, and therefore think it is important that this natural machinery should be kept going, as it is now. You may think that if this machinery were stopped, and the harbor were made a mere arm of the sea, without reservoirs, it could be kept open by artificial means, without a great injury from the loss of the natural forces. I suppose if there is any difference of opinion, it is at that point, and not at any point further back in the course of the inquiry as to the theory of the harbor. I do not suppose you differ, and it is not necessary for me to argue, as to the character of these forces; but I suppose that if you disagree, it is as to what their importance is, and what the effect of removing them would be.

Now, their effect has been, that the harbor has been kept from the beginning of things to the present time substantially the same harbor. The reservoirs have been narrowed, but the outlets have been narrowed proportionately; so that on the whole, from the beginning of our history to the present time, the changes, although they sound large when stated in cubic yards of material removed and deposited, have left the harbor substantially as it was before. Now, whether we can diminish these reservoirs and reduce the power of these currents, and still keep the harbor open and free from deposits, is a speculative question, and one on which you, Mr. Chairman, may entertain one very decided opinion, and on which scientific men may entertain a different and equally decided opinion. It is purely a speculative question. But everybody seems to agree that on the whole the present forces of the harbor have kept it in tolerably good condition.

I speak of the upper harbor particularly. The general opinion seems to be, that the natural machinery of the harbor is a good machinery, and has kept the thing going very well. Can it be possible that you or any other committee of the legislature would think it worth while to abandon that natural machinery, or essentially and substantially change its proportions, and injure its working, for the sake of proving the truth or falsehood of any theory as to what the result would be? You agree, everybody agrees, I presume, what the forces of the harbor do now. The question at issue is a purely speculative one; how should we get along without them? Well, can it possibly be that you will think of abandoning them, or materially changing their relative magnitude, for the purpose of testing that question? Would you shut up Charles River for the purpose of showing that Boston harbor could be kept open by dredging? I am sure that you would not, even though you were thoroughly convinced of it. Even if it were possible that you would run the risk of trying it, if it were a matter of your own, I do not believe that you would urge the Commonwealth, the city, or the private interests concerned in the harbor, to run any such risk on any conviction of your own, however well you might be satisfied of it. I should as soon think of your inventing an ingenious machine for flying, and, being extremely confident of its success, make your first experiment by jumping with it from the roof of the State House. I think you would prefer to continue to use your legs to go down stairs with, rather than try your machine in that way. And it would be quite analogous to that, to abandon the scouring forces of these tidal reservoirs with a view of deciding the question whether they are needed or not.

Then on the question of sewerage; that is the next public exigency that we considered might possibly weigh with the committee. It is very clear that any interference at present with the river, with a view of accommodating it to a future system of drainage, would be premature; because the river is essential to

the present system, and nobody can tell what the future system is to be. This whole subject of sewerage is in its infancy; and we can afford to wait until the many large cities in England, upon which the question is now pressing with a force which must be met at once, have given us the results of their experiments. It is not necessary to do anything about sewerage at present, except for the purpose of removing any immediate nuisance; and there is no pretence of any such nuisance as would justify interference on the part of the Commonwealth.

I am not going into the argument upon the question of health, gentlemen, because that has been thoroughly considered by others, who speak on the subject with authority.

There has been an argument, and evidence has been put in, as to the importance of developing the commerce of Watertown and the upper part of the river. The learned counsel who argued in favor of this scheme said, if I understood him rightly, that Charles River was one hundred miles long from its mouth to its source. That is the distance by water. You know, Mr. Chairman, how far it is by land, — about fifteen or twenty miles, I believe; and that proportion expresses very well the value of Charles River as a navigable stream. I am not here, however, to oppose the opening of the navigation of the Charles, if the committee think it desirable. But that any such exigency exists for deepening Charles River up to Watertown as would warrant you in destroying these rights of ours, merely to give them a dumping-ground for their dredgings, is a proposition that does not need to be met by argument. It needs only to be stated.

One other suggestion has been thrown out here; that the purpose of this committee was to lay out a plan for future guidance, to prevent the flats being seized by private speculators, and to establish lines which should regulate the future arrangement of the riparian territory, and should prevent any further stealings by interested parties. Well, there are occasions when

undoubtedly such action on the part of the State is necessary. But so far as this particular locality is concerned, all the action of that kind that was needed seems to have been taken when the harbor lines were established in 1840. These were limits. They limit the right of private parties to build out. There can be no more thieving, since these lines are established. And I believe along here on the Cambridge side, it turns out that the harbor lines are within the limits of riparian right; so that the harbor lines are now merely restrictions of private ownership, instead of invitations to encroachments. So that here there does not seem to be any necessity for drawing new lines, for the rescue to the flats from private speculation, or from being taken for improper purposes.

But, gentlemen, if you can do anything to stop the stealing of flats in the Commonwealth, do it by all means. If you see any way in which you can lay down lines, or establish regulations that will prevent the absorption of any more of the harbor areas, or the water areas held by the Commonwealth for the public use, why do it. You are the guardians of the harbors, and to a certain extent and for certain purposes you are the owner of the soil under the sea. Protect the public rights from plunderers, by all means. But don't go into the matter with a view of speculating in land on behalf of the Commonwealth, and so making the Commonwealth the chief plunderer; protect the public domain from the encroachments of individual water-thieves, but don't let us have to fear that the Commonwealth, itself is the most rapacious and the most dangerous, because the most powerful of the water-thieves. Don't let us have to fear that the government of the State, the guardian of all our rights, like a sheep dog that has tasted blood, is a greater danger than the whole pack of wolves.

At the conclusion of Mr. Putnam's argument, the chairman declared the hearing closed.

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